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SITE INDEX CURVES  
FOR  
SOME FOREST SPECIES  
IN THE  
EASTERN UNITED STATES



Prepared by  
Eastern Region - Forest Service  
U. S. Dept. of Agriculture  
Upper Darby, Pennsylvania  
1965

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*4* (Revised) *4*

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*5c* 1965

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Frederick E. Hampf

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## FOREWORD

Indices of site quality are important to forest management. They indicate the relationships between productivity and the many environmental factors influencing an ecosystem. Site Index is a single, quantitative expression of the multitude of factors that make up site quality. For a single tree species, variations in height growth due to variations in the site factors have been found to be closely and positively correlated, more so than variations in diameter or volume growth. For this reason, height growth is the factor in common use in this country as an index of site. The height attained by the average dominant and codominant trees at the age of 50 years is generally used in the Eastern United States as the index of site quality and is known as Site Index.

For years, foresters have prepared tables and graphs showing the site index for a specific stand, species, or area. Some of this information is therefore limited in application, and the publications are not generally available to the practicing forester. To make it possible for foresters to have curves for several species under one cover, all available data in the Regional Office was studied and correlated. After consulting with the Northeastern Forest Experiment Station of the U. S. Forest Service and the Northeast Regional Office of the U. S. Soil Conservation Service, figures were prepared showing site index curves for 32 eastern species. Where necessary,



curves were revised to show total age at 50-year base. The only exception is in the use of 30-year base for eastern cottonwood.

These curves are only as accurate in application as the original data on which they are based. They may not fit perfectly in all situations. However, these curves will enable foresters to come up with a reasonable estimate of site index (total height in feet at 50 years of age) from measurements taken on trees which are more than, or less than, 50 years of age.

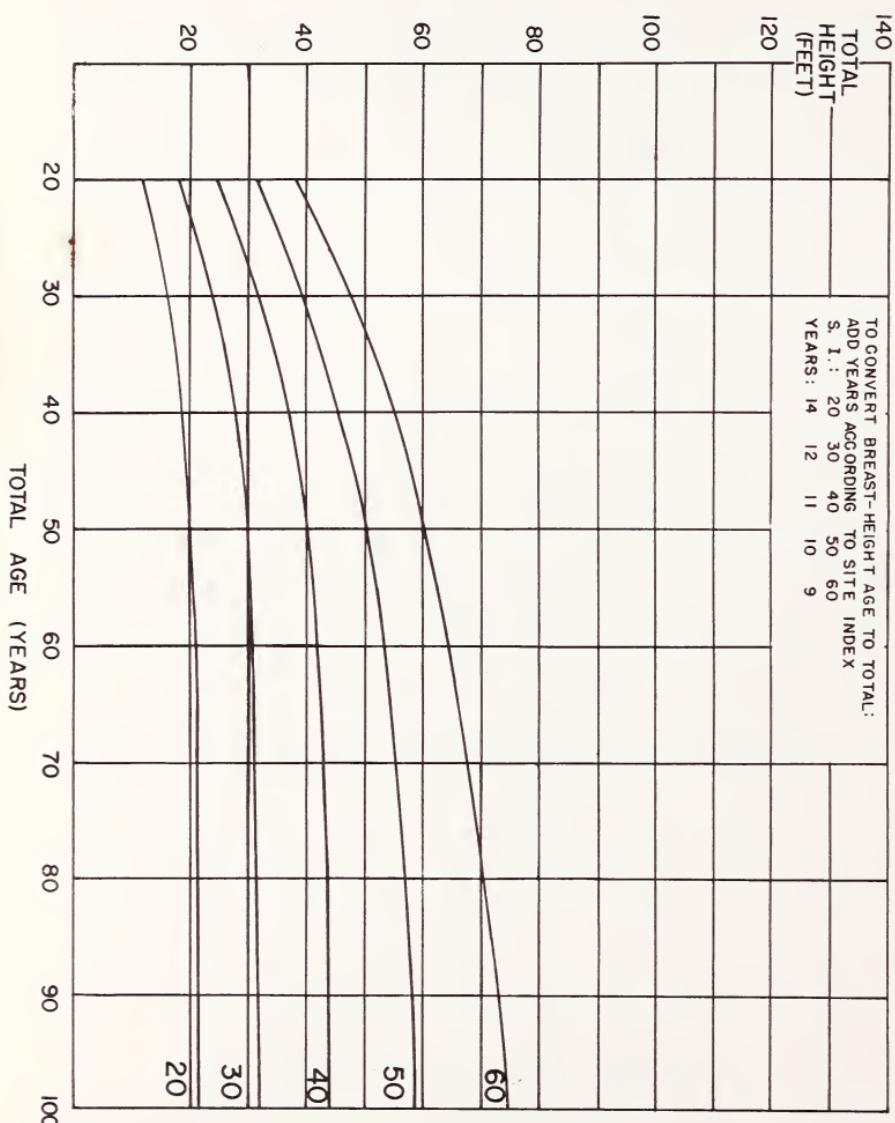
Limit of geographic reliability for the curves is shown at the top of each page. Because of marked differences in growth behavior, curves for more local areas are shown for eastern white pine, sweetgum, and yellow-poplar.

Before determining site index, the average age correction shown for the species should be added to the average breast-height age taken from borings at that point on the sample trees to obtain total age. Actual local age corrections for the species should be used when known. As a rule of thumb, one half of the age correction shown on the page should be added when boring at a stump height of one foot.

The source of information used is shown at the bottom of each page. Where two or more sources are shown, data from the first was used, and the others are listed because of close agreement.



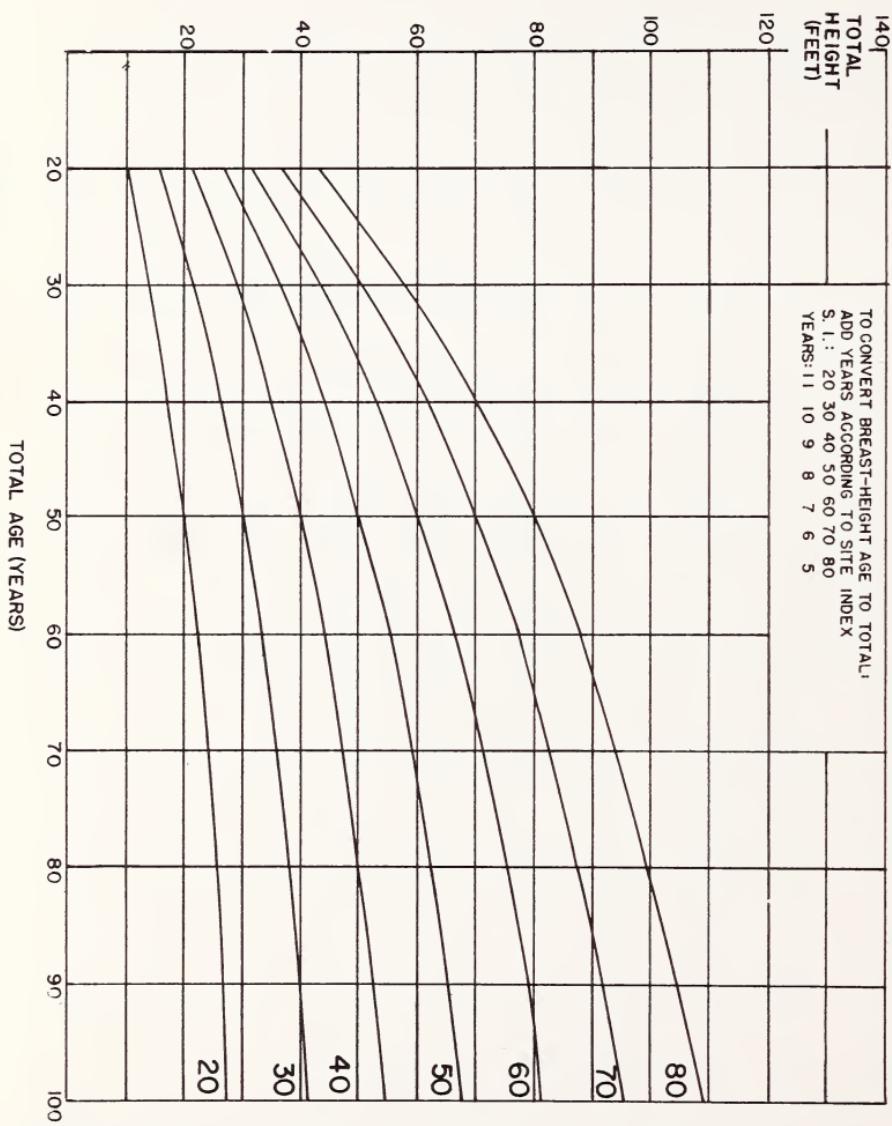
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX  
AT 50 YEARS, THROUGHOUT THE TENNESSEE VALLEY.



SOURCE: USDA, SCS, SPARTANBURG, S.C., 1956, BASED ON 271 OBSERVATIONS FROM PLOTS THROUGHOUT TENNESSEE VALLEY, SUMMER, 1948.



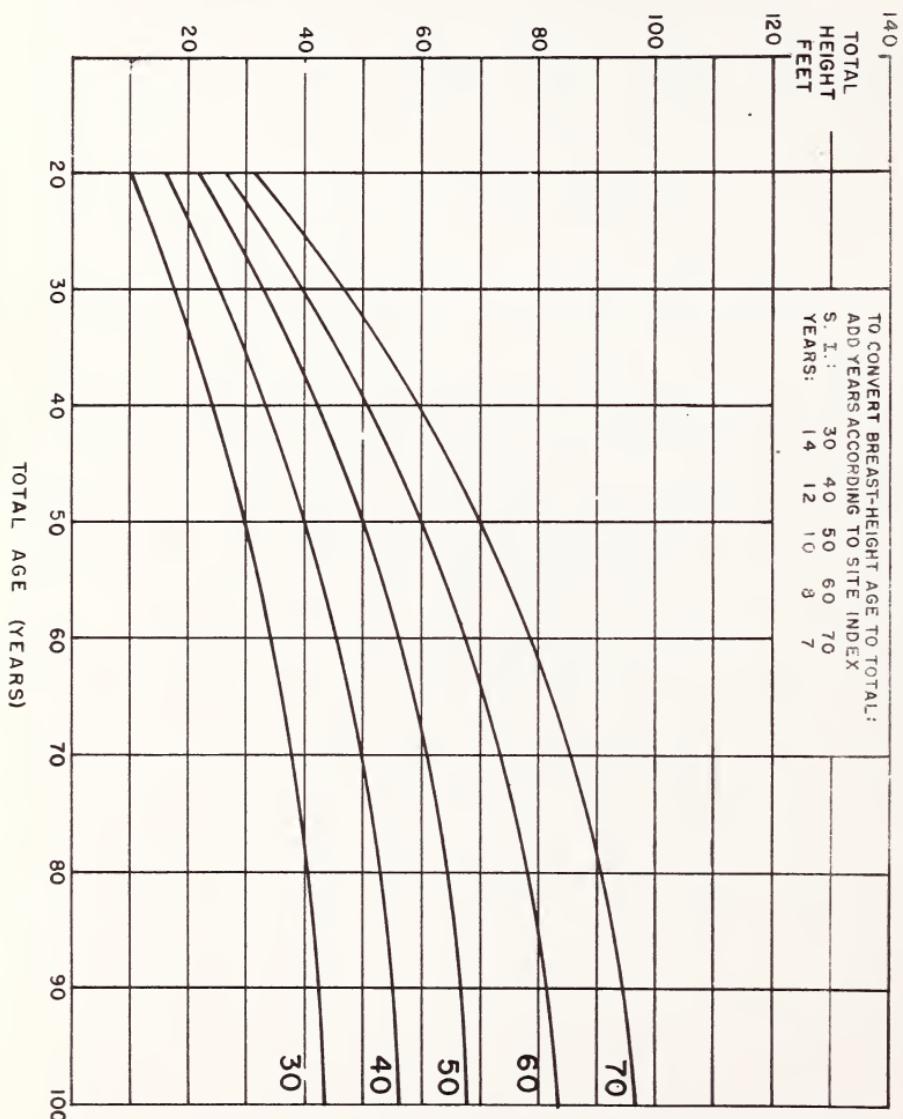
HEIGHT IN FEET OF AVERAGE SECOND-GROWTH DOMINANT TREES,  
BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.



SOURCE: KORSTIAN, C.F., BRUSH, W.D., SOUTHERN WHITE CEDAR,  
U.S.D.A. TECH. BULL. NO. 251, SEPT. 1931.



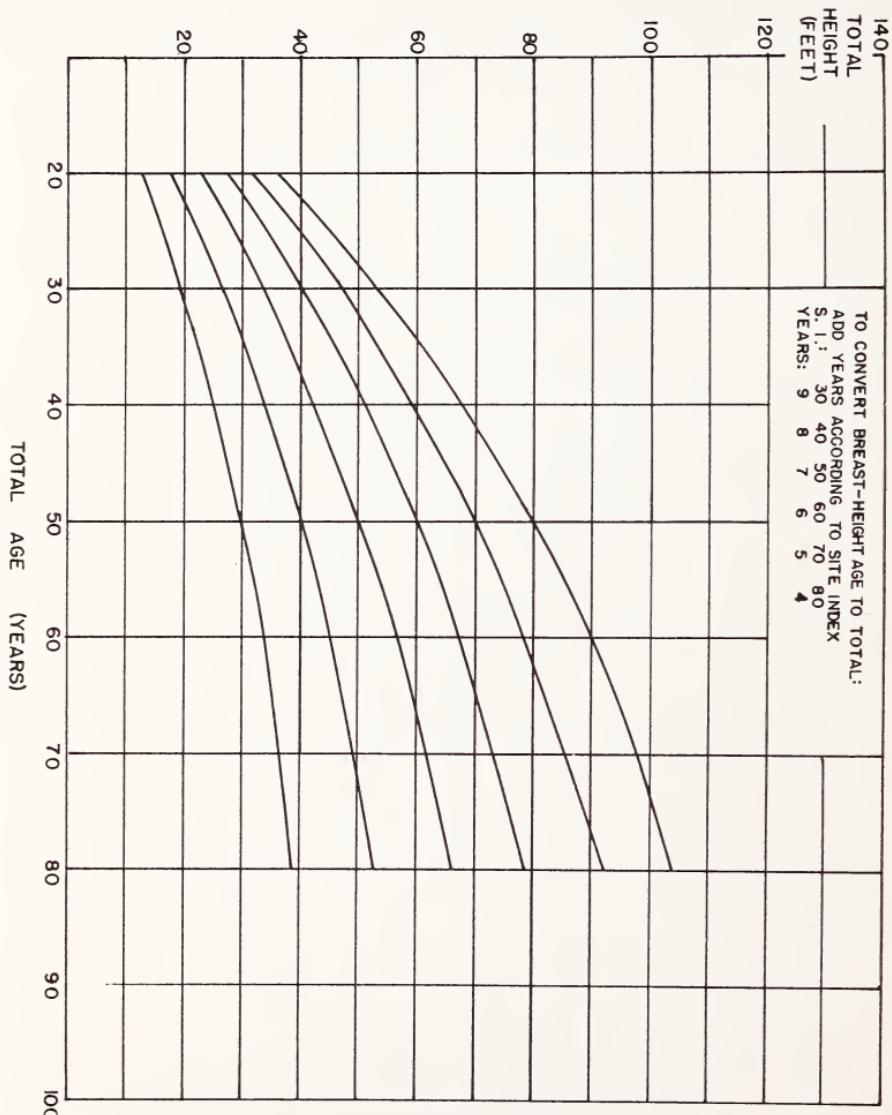
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES  
BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.



SOURCE: MEYER, W.H., U.S.D.A. TECH.BULL.NO.142, 1929. GEVORKIANTZ, S.R., LAKES STATES FOR EXP.STA.TECH NOTES NO. 465, OCT.1956.



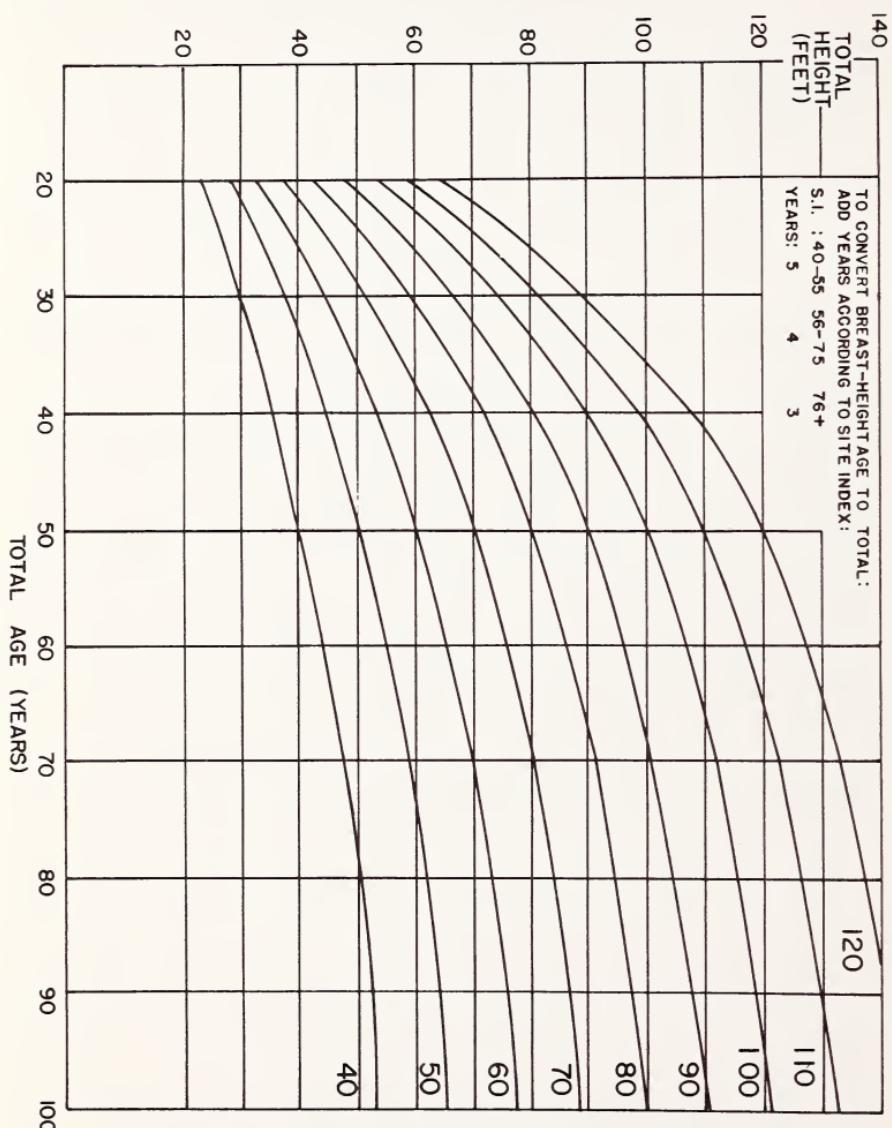
HEIGHT OF AVERAGE DOMINANT & CODOMINANT TREES IN EVEN-AGED STANDS, BY SITE INDEX AT 50 YEARS, IN LAKE STATES.



SOURCE: GEVORKIANTZ, S.R., LAKE STATES FOR. EXP. STA. TECH. NOTES NO. 463, OCT. 1956. EYRE, F.H., & LE BARRON, R.K., U.S.D.A. TECH. BULL. NO. 863, 1944. STERRETT, W.D., U.S.D.A. BULL. NO. 820, MAY, 1920. WACKERMAN, A.E., ZON, R., WILSON, F.G., U. OF WISCONSIN RES. BULL. NO. 90, MARCH, 1929.



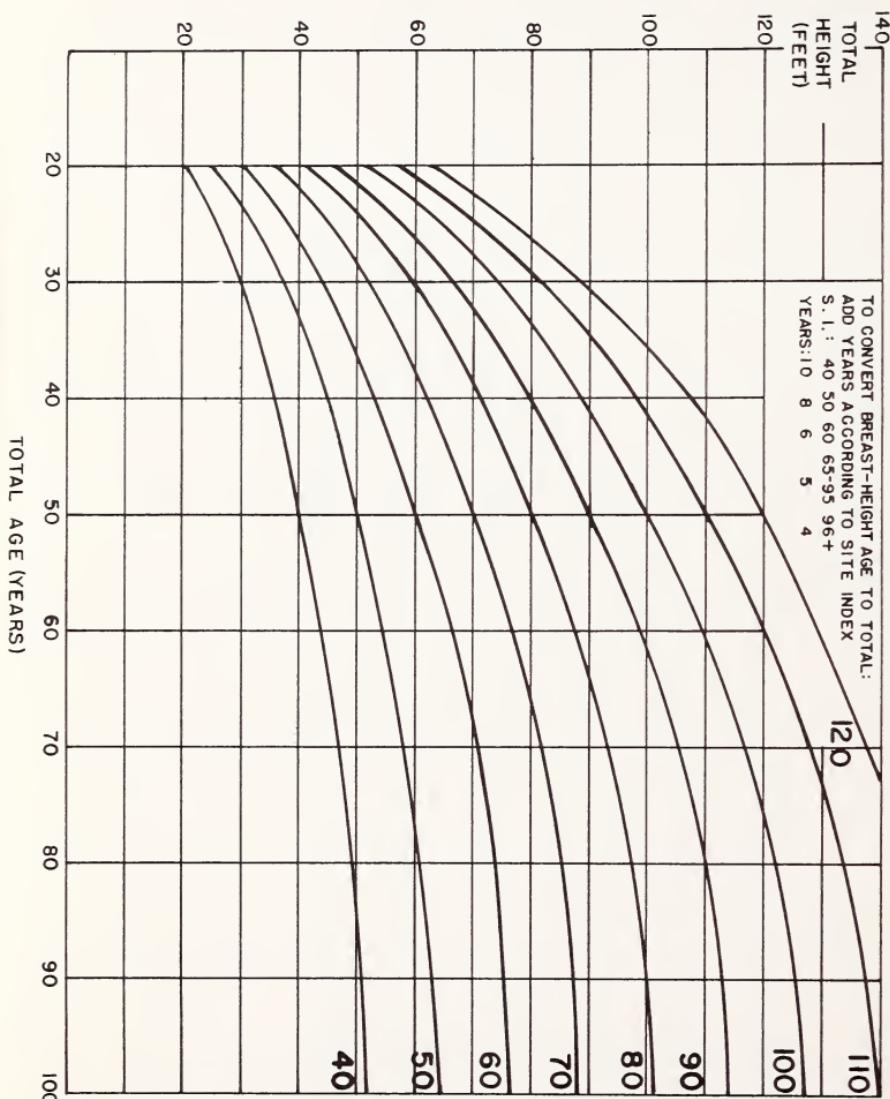
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT  
50 YEARS, COASTAL & PIEDMONT AREAS, SOUTHEASTERN U.S.



SOURCE: VOLUME, YIELD & STAND TABLES FOR SECOND-GROWTH  
SOUTHERN PINES, U.S. DEPT. AGR. MISCELLANEOUS PUBL. NO. 50 (1929).  
REVISED BY COILE & SCHUMACHER, JOUR. OF FOR., JUNE 1953.



HEIGHT IN FEET OF SECOND GROWTH DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.

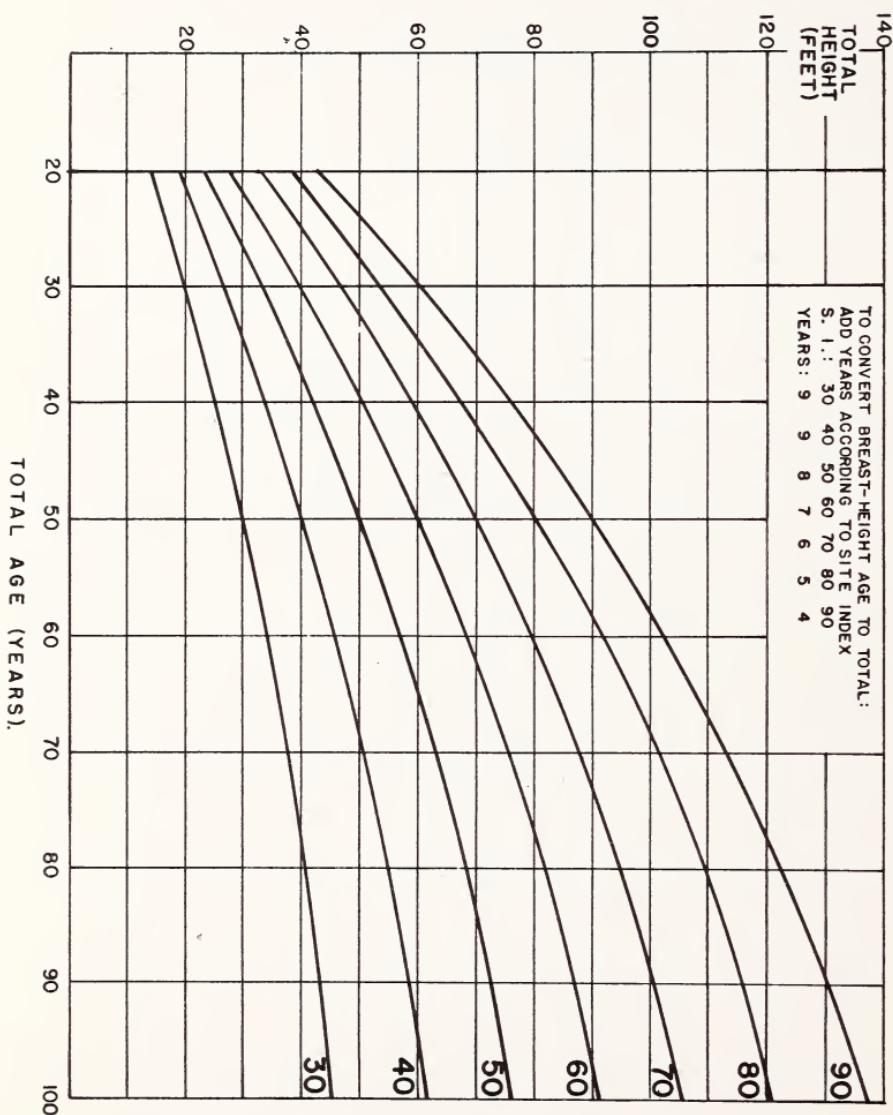


SOURCE: U.S.D.A. MISC. PUBL. NO.50, SEPT. 1929.

CRIKSHANK, J.W., S.E. FOR EXP. STA. RES. NOTES NO.50, JAN. 1954.  
(ABOVE CURVES AGREE CLOSELY WITH THOSE PREPARED BY  
SCHUMACHER, F.X. & COILE, T.S. PUBLISHED JAN. 1960.)



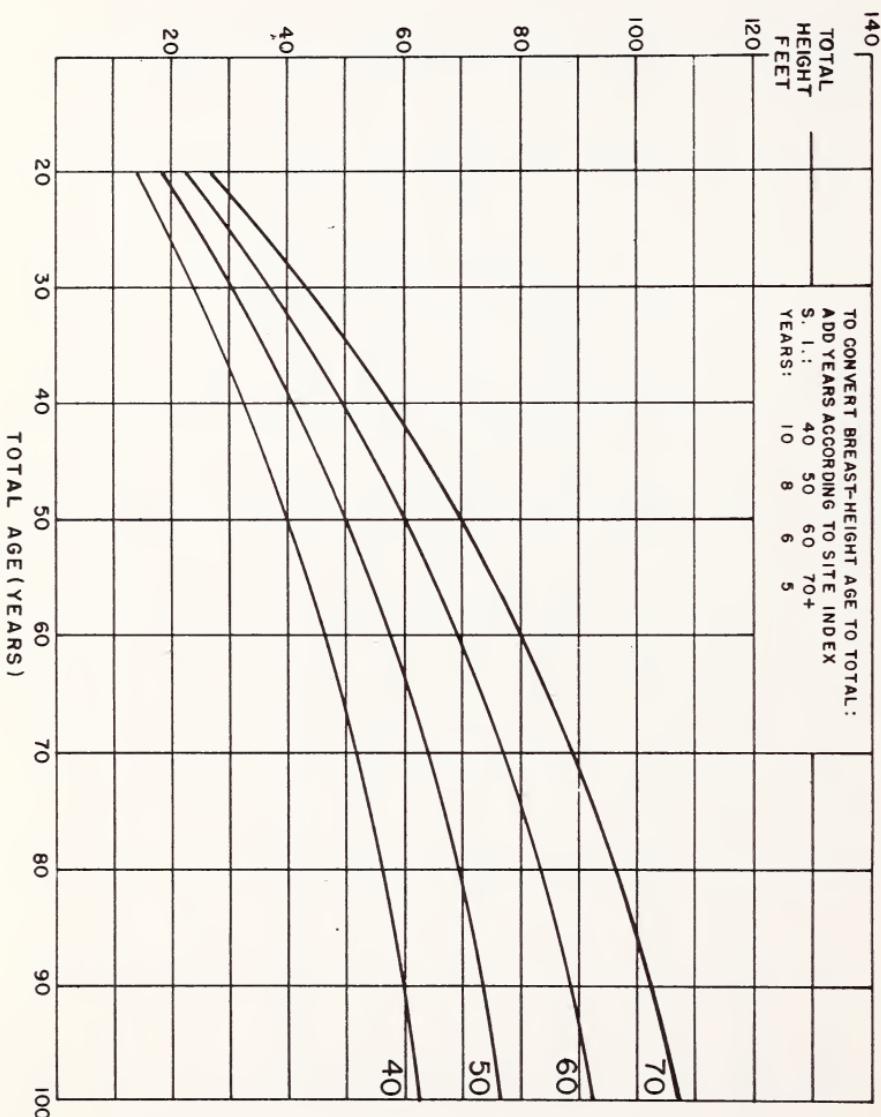
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE  
INDEX AT 50 YEARS, IN NATURAL RANGE.



SOURCE: ILLICK, J.S. & AUGHANBAUGH, J.E., PITCH PINE IN PENNSYLVANIA,  
PA. DEPT. OF FORESTS & WATERS RES. BUL. NO. 2, 1930.



HEIGHT IN FEET OF EVEN-AGED AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN THE LAKE STATES.

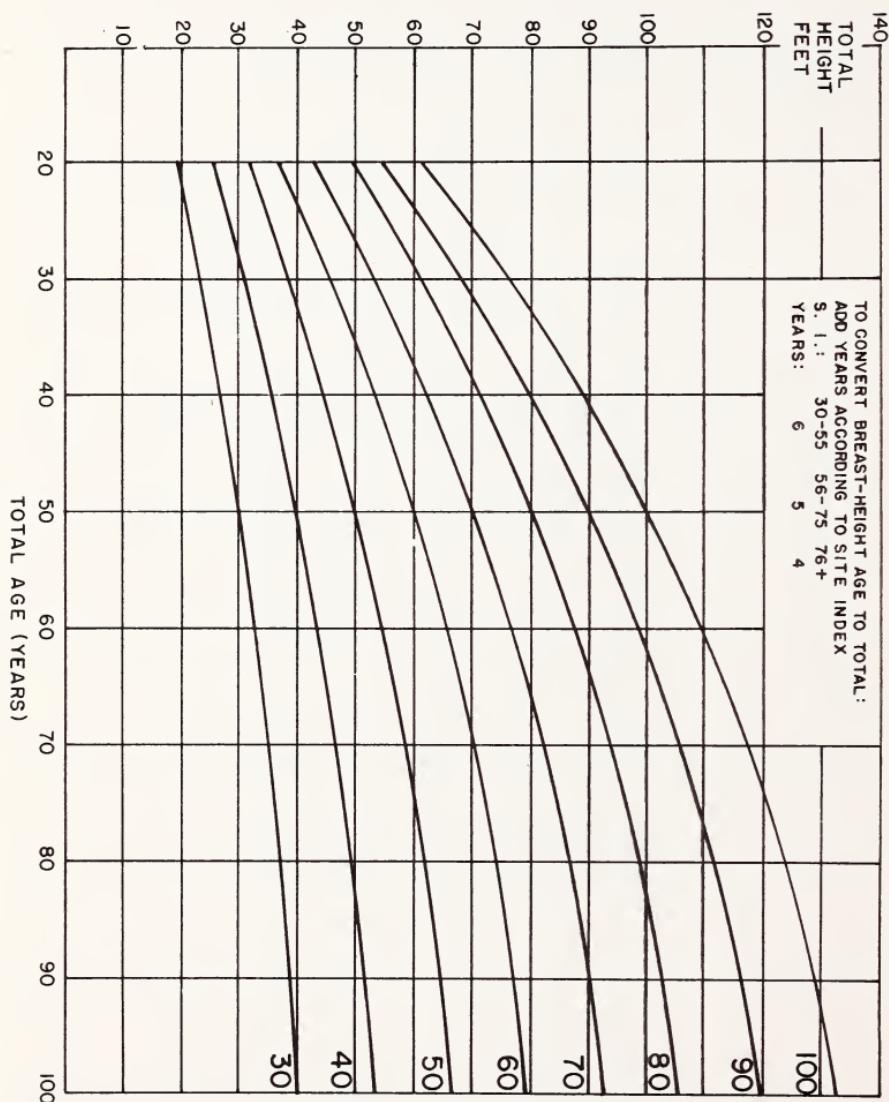


SOURCE: GEVORKIANE, S.R., LAKE STATES FOR EXP. TECH. NOTES NO. 484, APRIL 1957.

EYRE, F.H. & ZEHNGRAFF, U.S.D.A. CIR. 778, MAY 1948.  
BUCKMAN, R.E., U.S.D.A. TECH. BULL. NO. 1272, OCT. 1962.



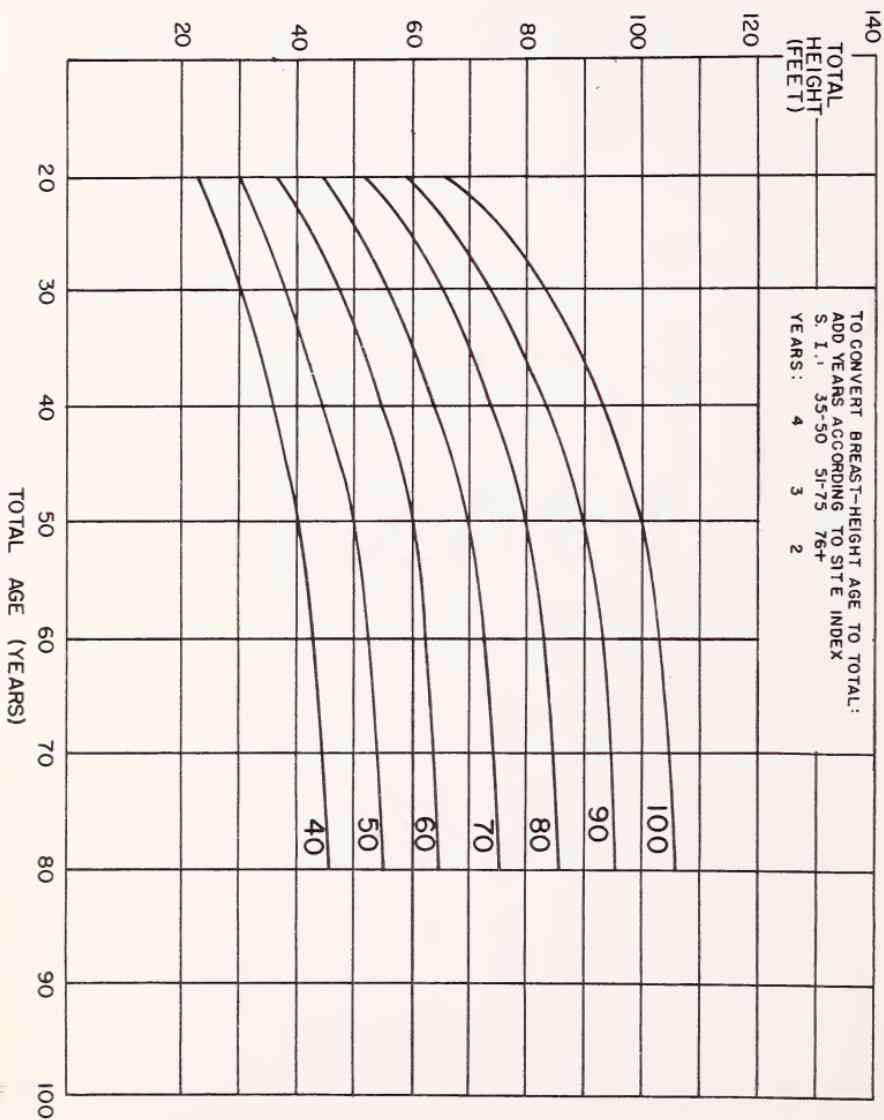
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS IN NATURAL RANGE



SOURCE: BASED ON HEIGHT GROWTH DATA IN U.S.D.A. PUBL. #50(1929),  
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JUNE 1953.



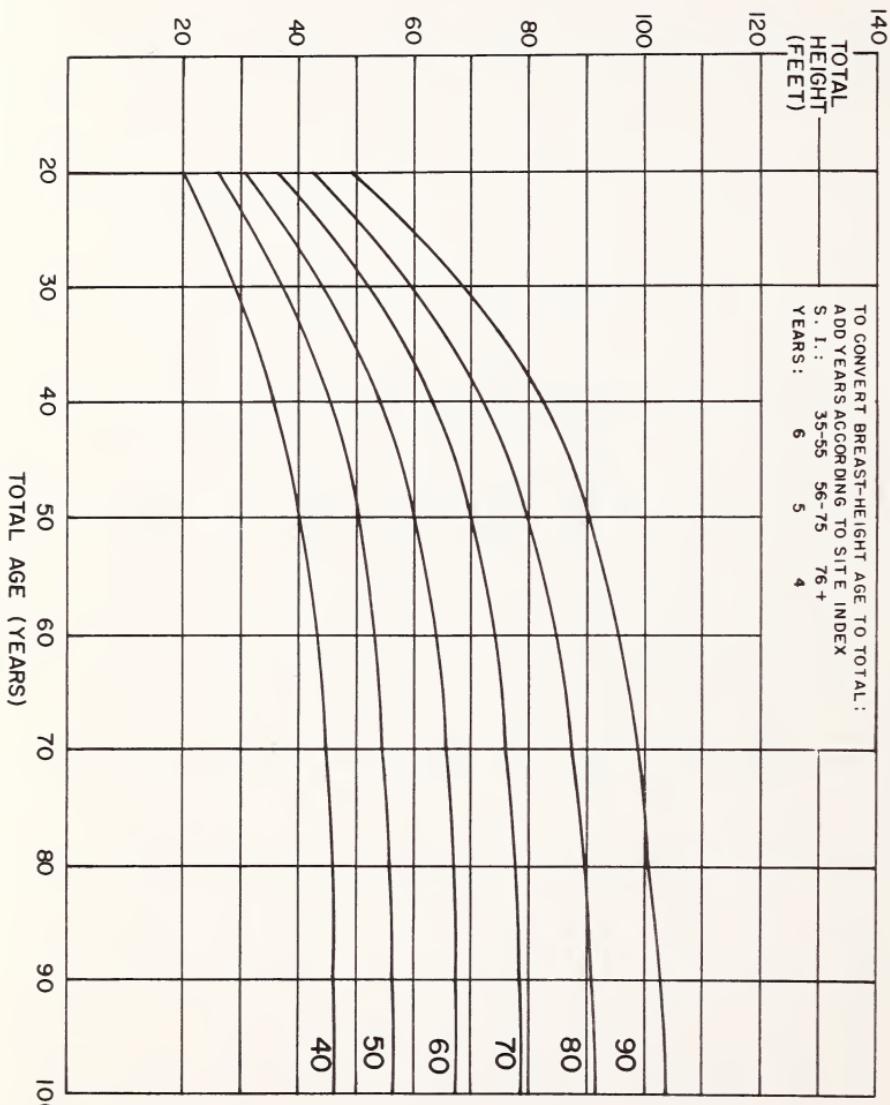
HEIGHT IN FEET OF SECOND-GROWTH DOMINANT TREES, BY SITE INDEX  
AT 50 YEARS, IN NATURAL RANGE.



SOURCE: U.S.D.A. MISCELLANEOUS PUBL. NO. 50, SEPT. 1929. CRUIKSHANK,  
J.W., S.E. FOR. EXP. STA. RES. NOTES NO. 50, JAN. 1954.  
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PARED BY SCHUMACHER, F.X. & COILE, T.S., PUBLISHED  
JAN. 1960.)



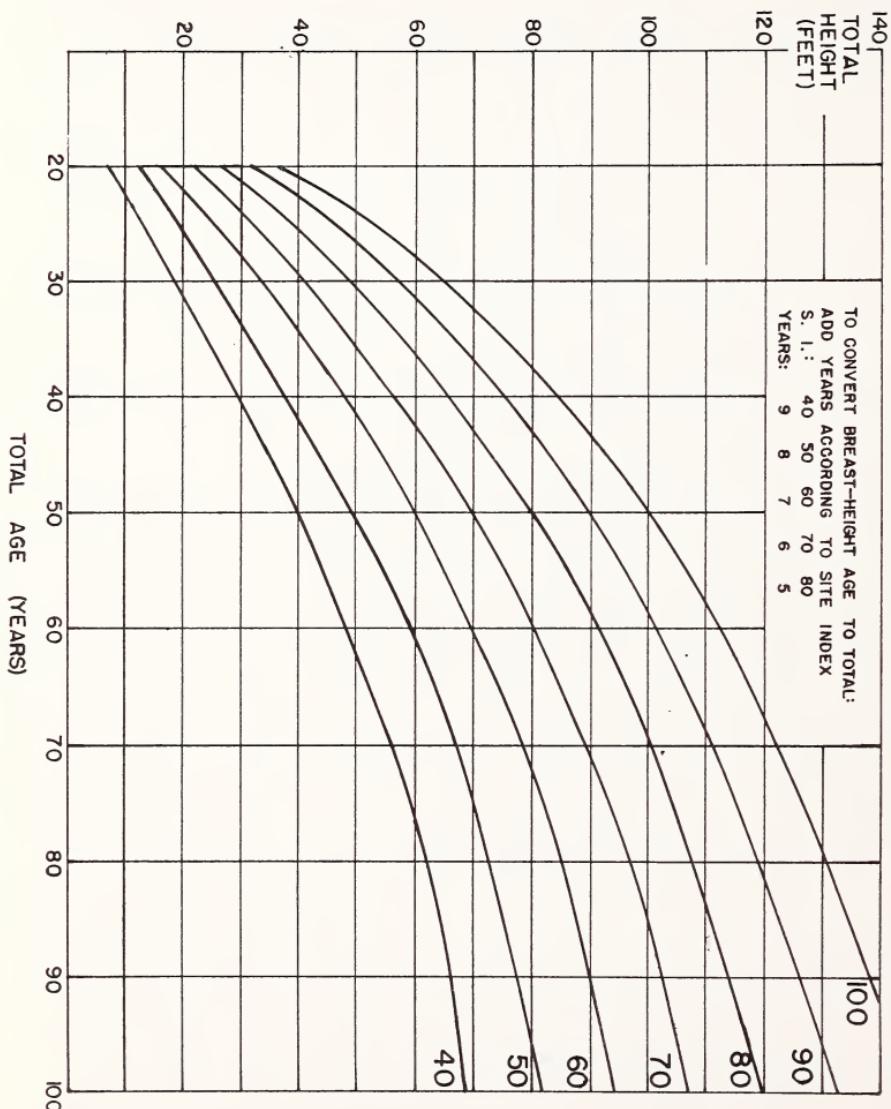
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX  
AT 50 YEARS, IN THE EASTERN U.S.



SOURCE: CHAIKEN, L.E., & NELSON, T.C., S.E. FOREST EXP. STA.  
RESEARCH NOTES NO. 135 NOV. 1959. N.C. STATE  
COLLEGE TECH. BULL. 100, '58.



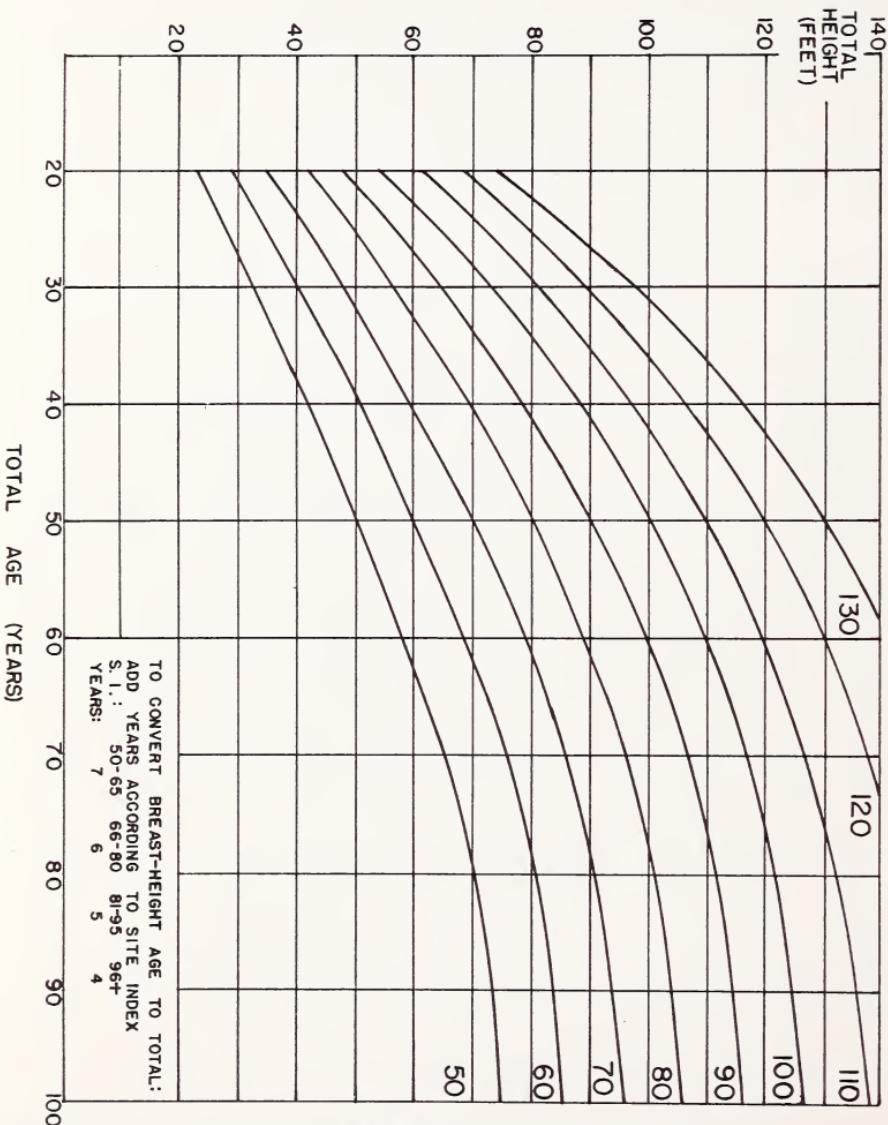
HEIGHT: IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT  
50 YEARS, IN NEW ENGLAND & MIDDLE ATLANTIC STATES.



SOURCE: FROTHINGHAM, E.H., U.S.D.A. BULL. NO.13, 1914.



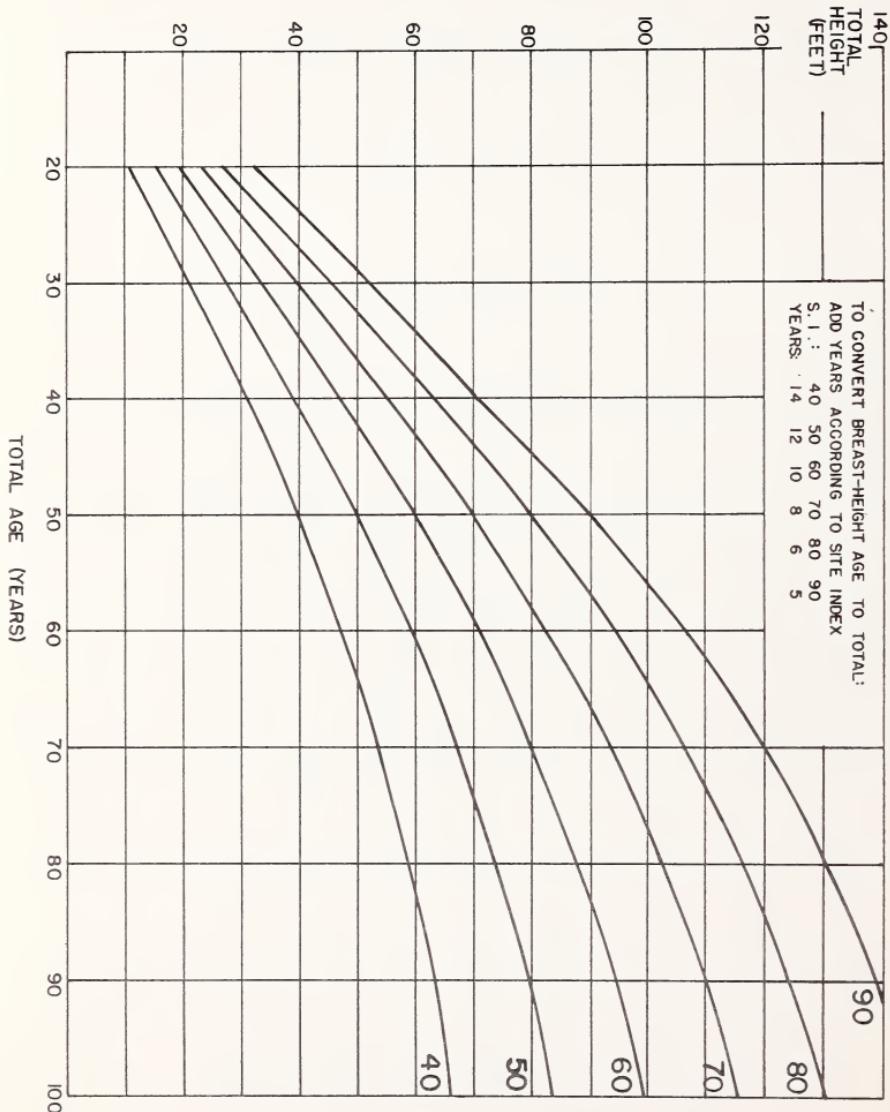
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN THE SOUTHERN APPALACHIANS.



SOURCE: DOOLITTLE, W.T. & VIMMERSTEDT, J.P., S.E. FOR. STA.  
RES. NOTES NO. 141, MARCH 1960.



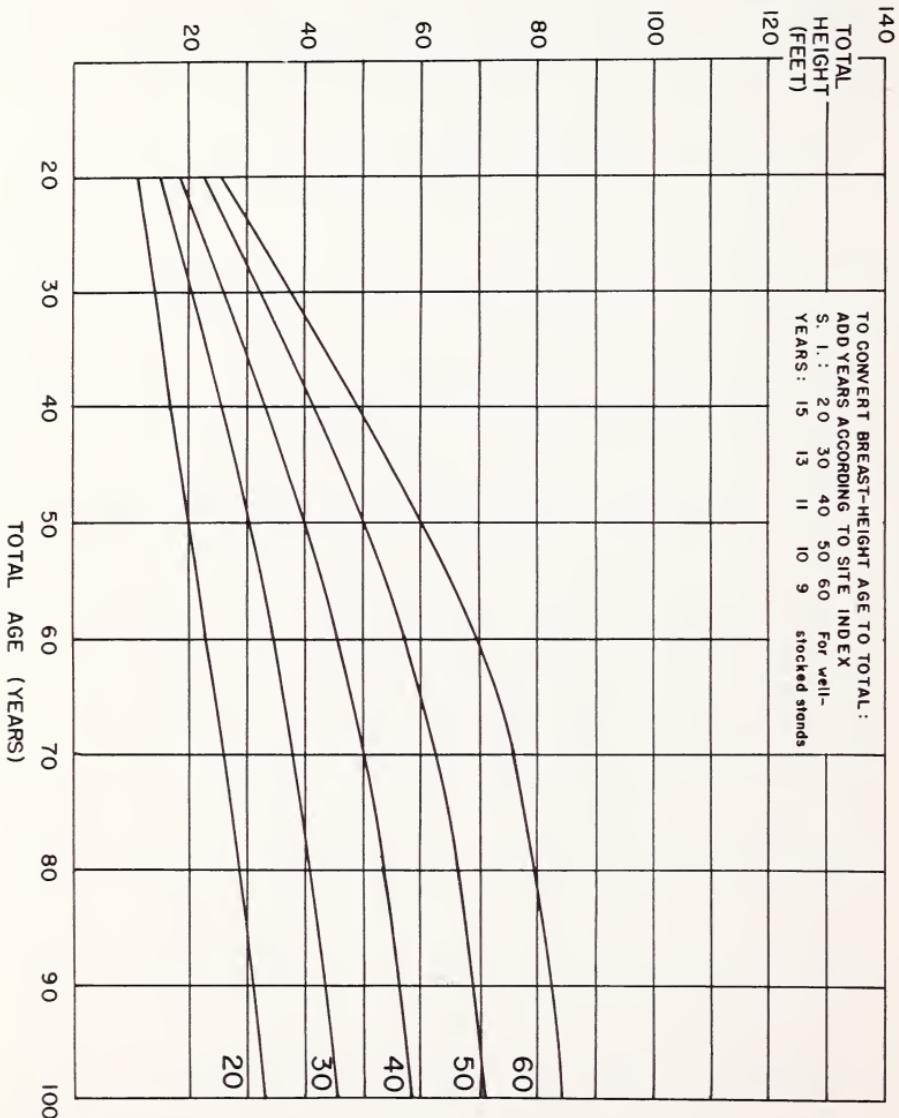
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN THE LAKE STATES.



SOURCE: GEVORKIANTZ, S.R., LAKE STATES FOR EXP. STA. TECH  
NOTES NO. 483, APRIL 1957.



HEIGHT IN FEET OF AVERAGE DOMINANT TREES IN EVEN-AGED STANDS, BY SITE INDEX AT 50 YEARS, IN LAKE STATES.



SOURCE: BOWMAN, A.B., MICH. AGR. EXP. STA. TECH. BULL. NO. 188, 1944.

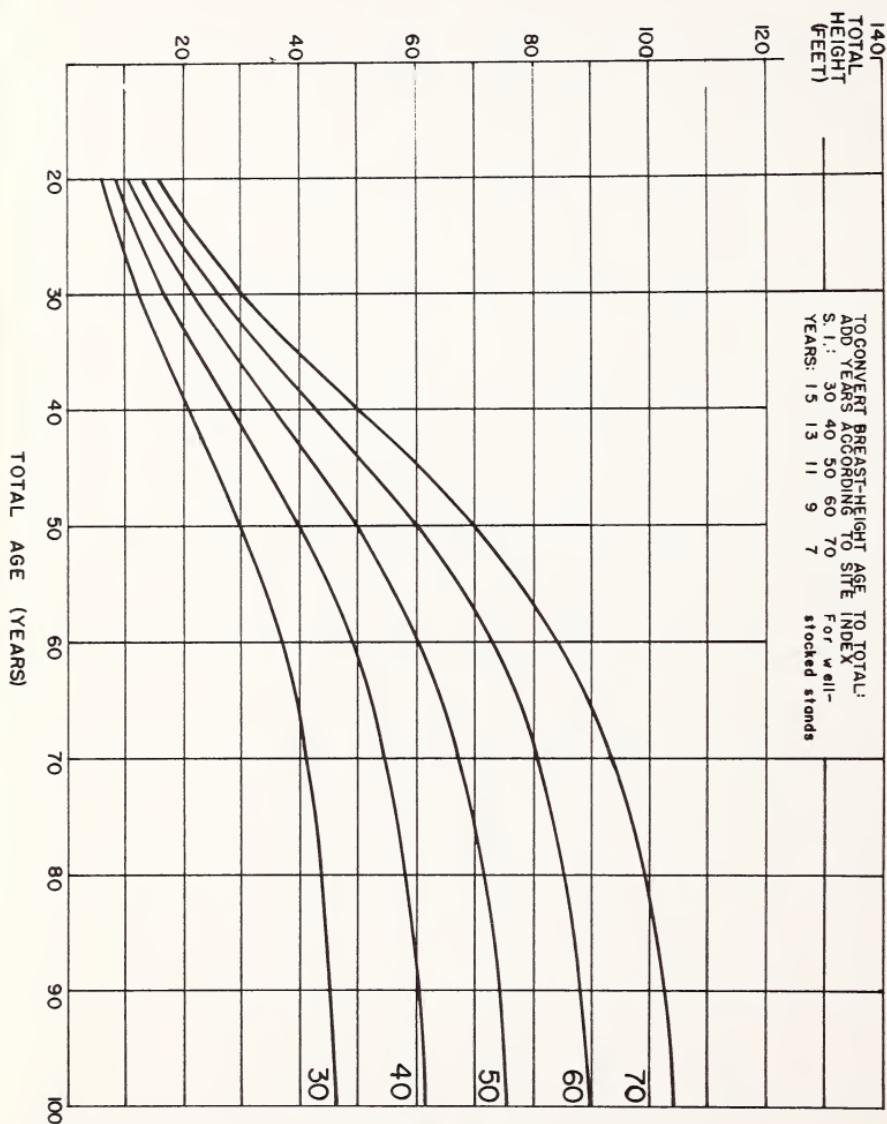
FOX, G.D. & KRUSE, G.W., JOURNAL OF FORESTRY 37:565-567,

1939. LEBARRON, R.K., U.S.D.A. CIRCULAR NO. 791, OCT. 1948.

MILLAR, J.B., FORESTRY CHRON. 15:93-96, 1939.



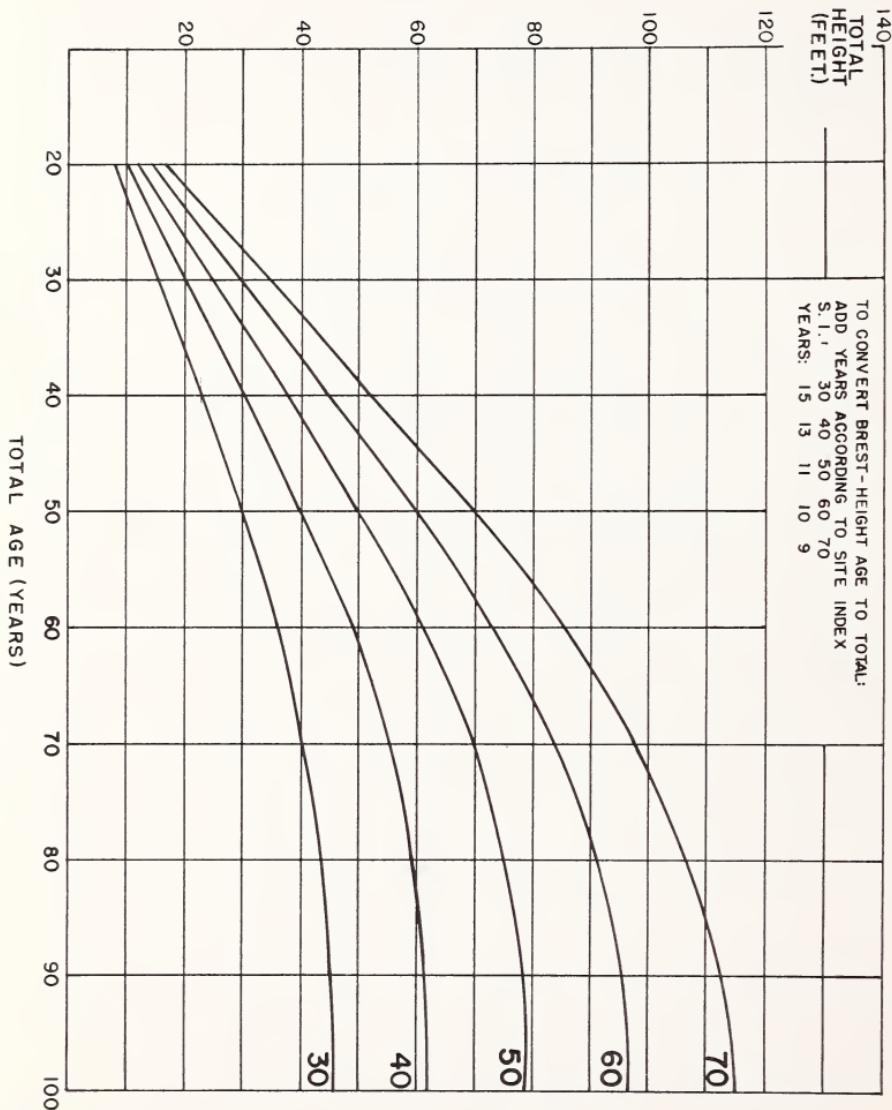
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES IN  
EVEN-AGED STANDS, BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.



SOURCE: MEYER,W.H., U.S.D.A. TECH. BULL. NO.142, NOV.1929.  
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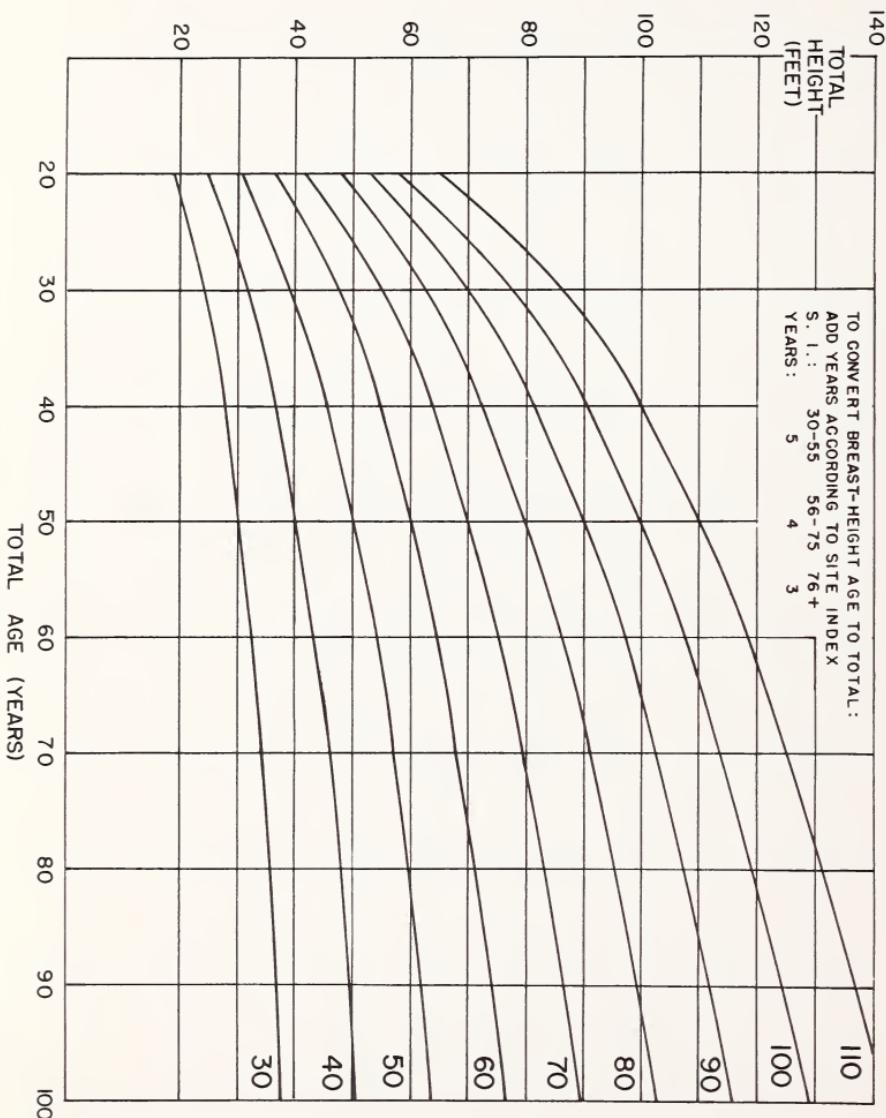
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, IN EVEN-AGED STANDS, BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.



SOURCE: W.H. MAYER, U.S.D.A. TECH. BULL. NO. 142, NOV. 1929.  
(REVISED TO 50-YEAR AGE FROM 65 YEARS.)



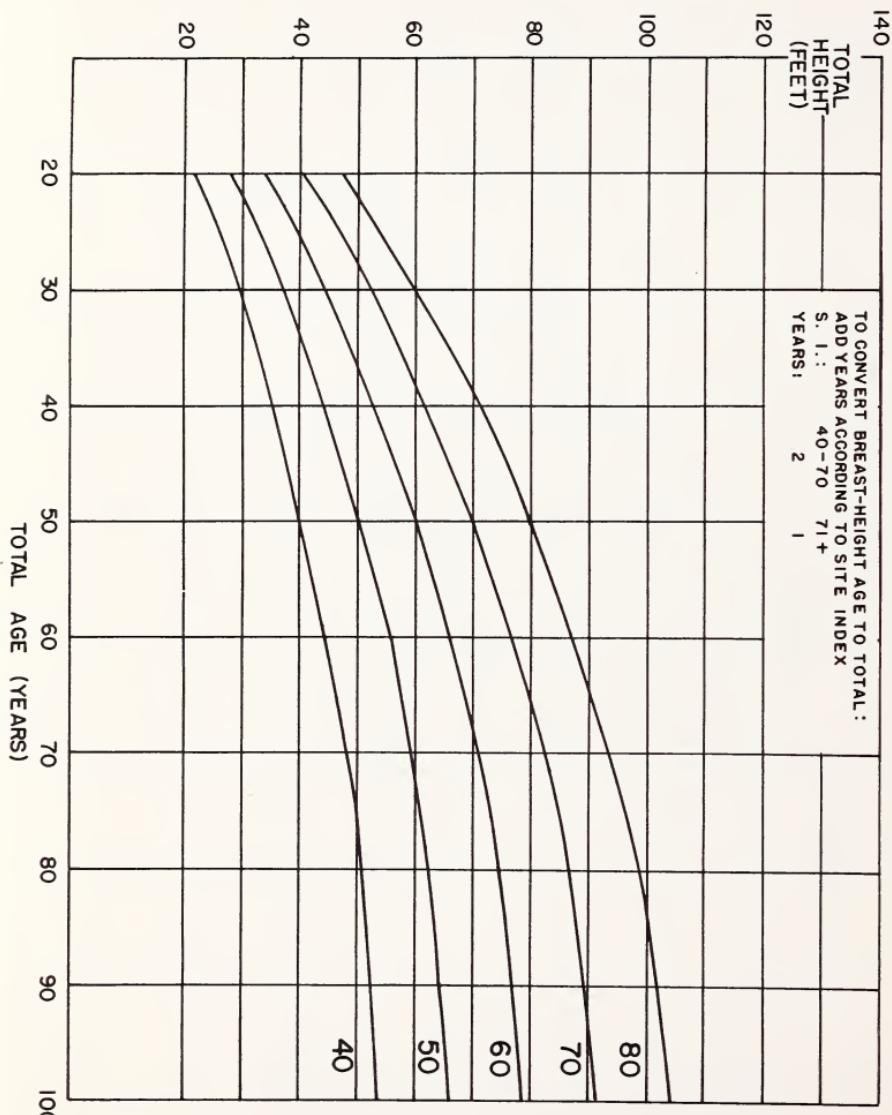
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES,  
BY SITE INDEX AT 50 YEARS, IN VERMONT.



SOURCE: CONSTRUCTED FROM FORMULA DEVELOPED BY R.O. CURTIS & B.W. POST, BULL. 629, AGR. EXP. STA. U. OF VERMONT & STATE AGRIC. COLLEGE, AUGUST, 1962. (CURVES AGREE CLOSELY WITH THOSE PREPARED BY VERMONT FOREST SERVICE-1957, FARRINGTON & HOWARD)



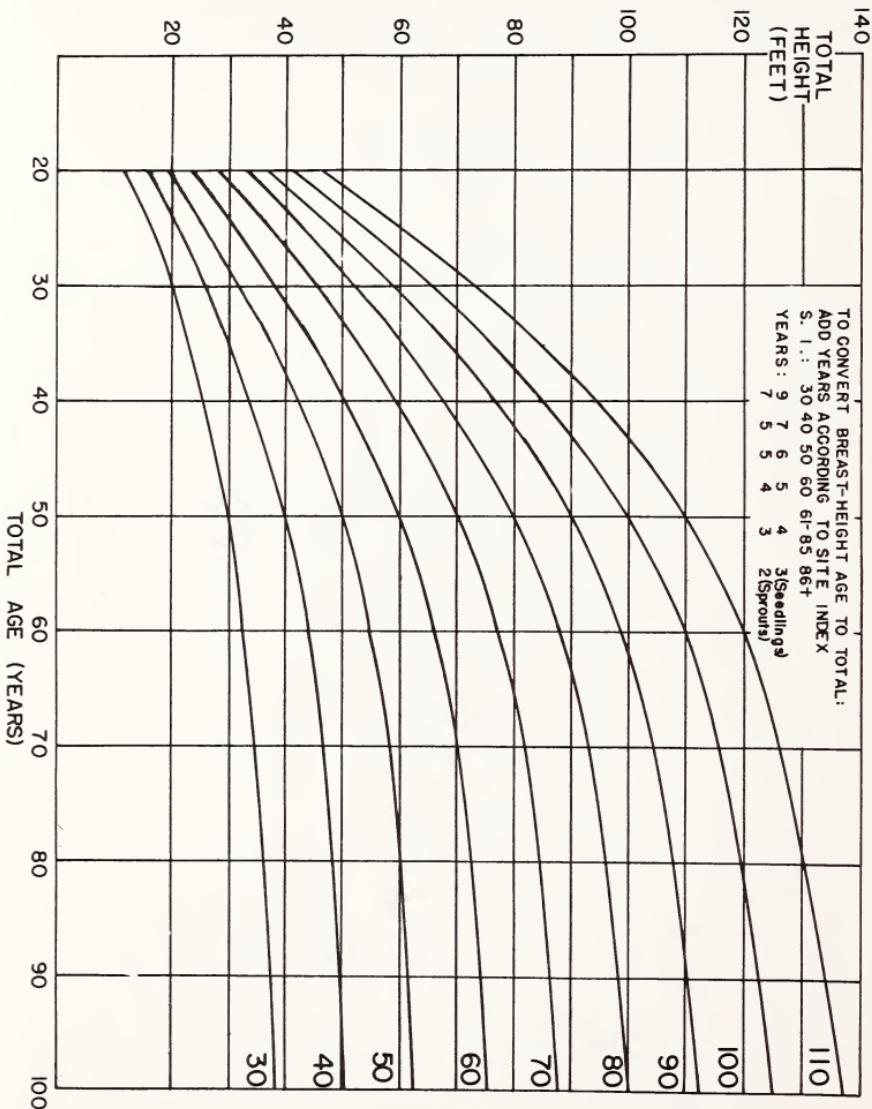
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX  
AT 50 YEARS, IN LAKE STATES.



SOURCE: GEVORKIANTZ, S.R., LAKES STATES FOREST EXP. STA., TECH.  
NOTES NO. 464 OCT. 1956.



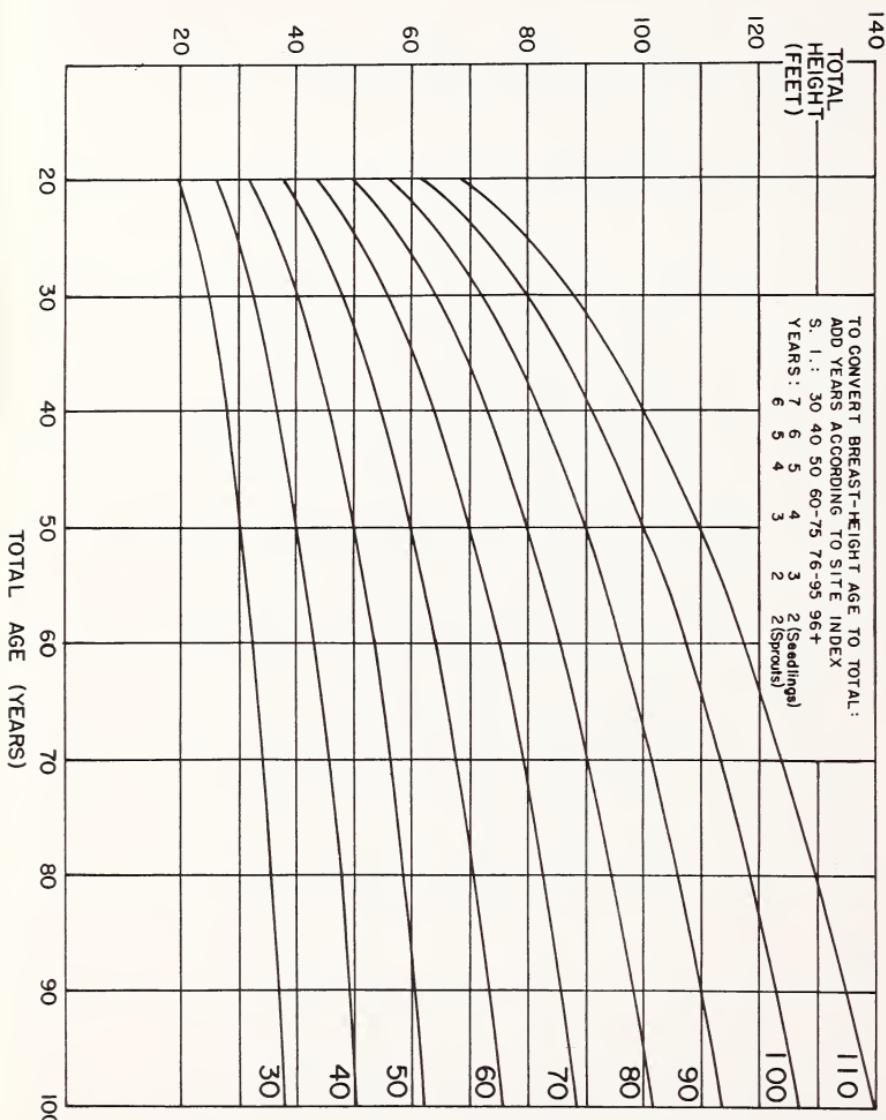
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN THE NORTHEAST.



SOURCE: CONSTRUCTED FROM UNPUBLISHED DATA, N.E. FOR. EXP.  
STA., UPPER DARBY, PA.



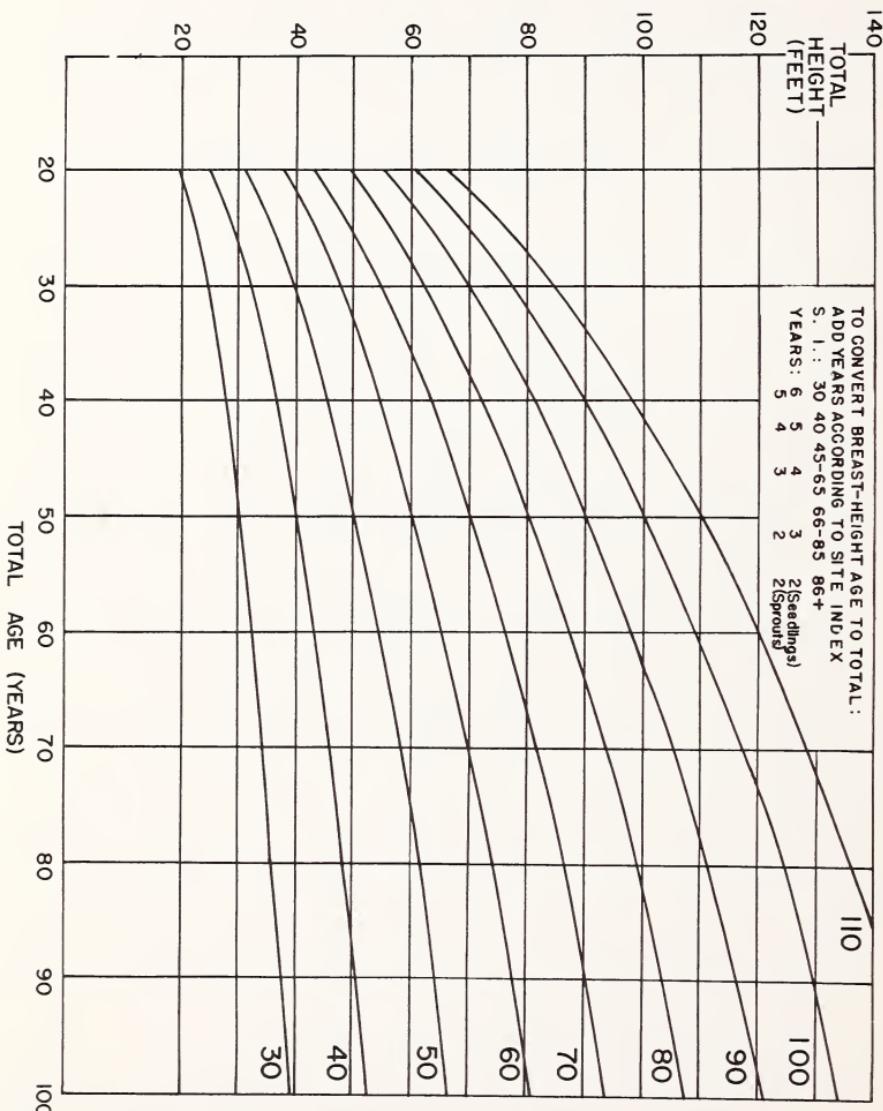
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES,  
BY SITE INDEX AT 50 YEARS, IN EASTERN U.S.



SOURCE: CONSTRUCTED FROM FORMULA DEVELOPED BY R.O. CURTIS &  
B.W. POST, BULL. 629, AGR. EXP. STA. U. OF VERMONT &  
STATE AGRIC. COLLEGE, AUGUST, 1962. COOLEY, J.H., LAKE  
STATES FOR. EXP. STA. TECH. NOTES NO. 541, OCT. 1958.



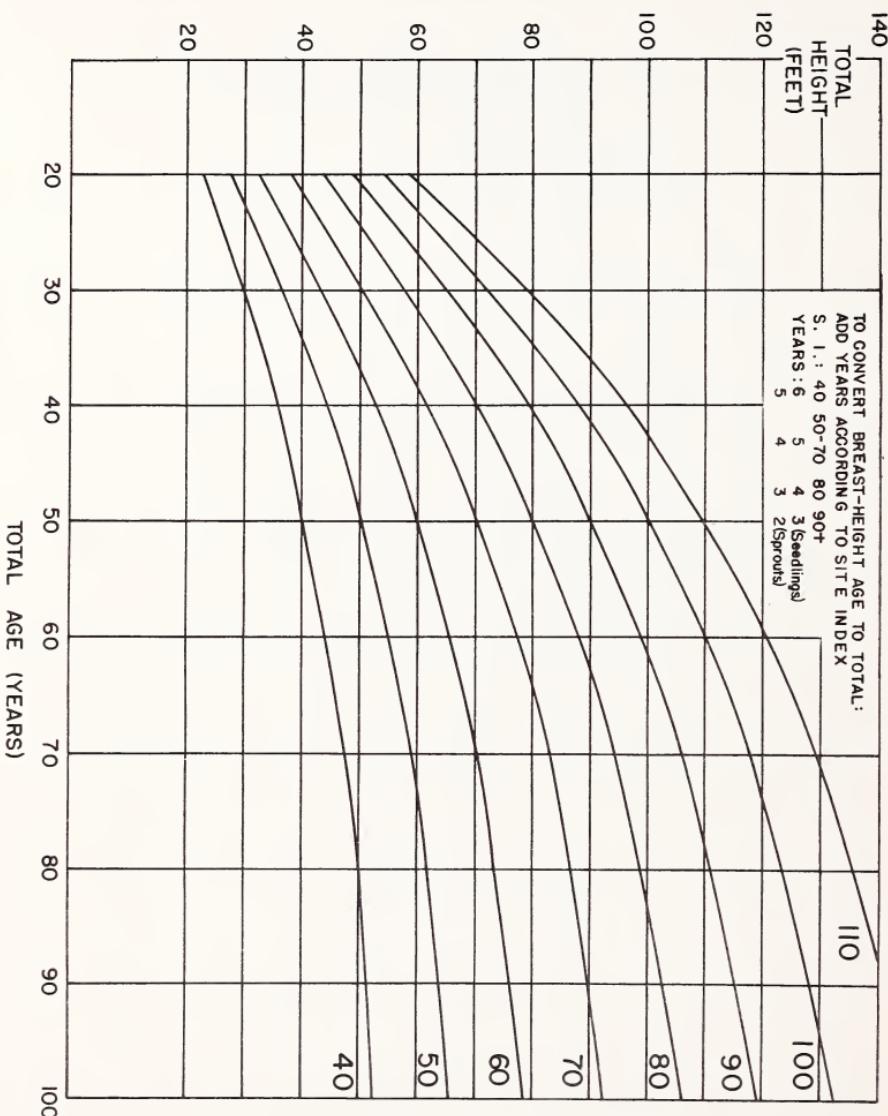
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SOURCE: CONSTRUCTED FROM FORMULA DEVELOPED BY R.O. CURTIS & B.W. POST, BULL. 629 AGR. EXP. STA., U. OF VERMONT & STATE AGR. COLLEGE, AUGUST, 1962.



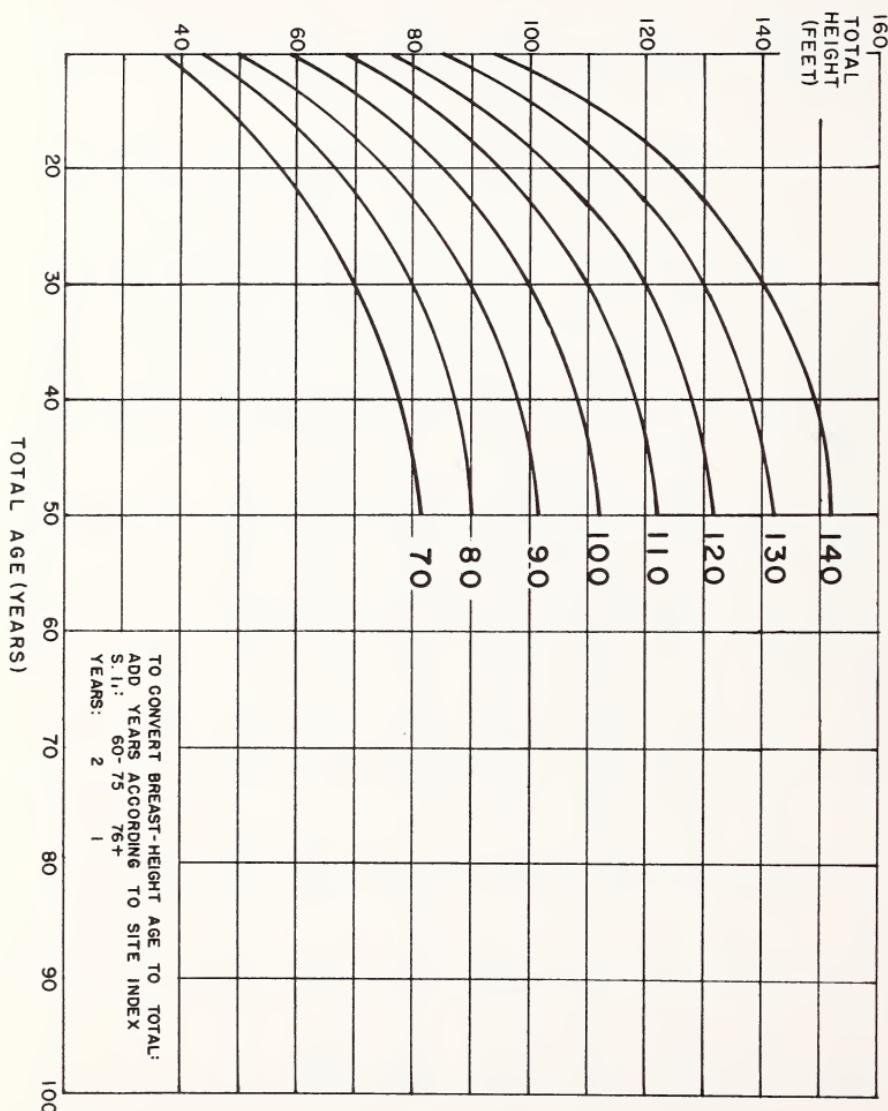
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX  
AT 50 YEARS, IN THE NORTHEAST.



SOURCE: PREPARED FROM A THESIS FOR GRADUATE DEGREE BY S.E.  
DEFLER, N.Y. STATE COLLEGE OF FORESTRY, 1937.



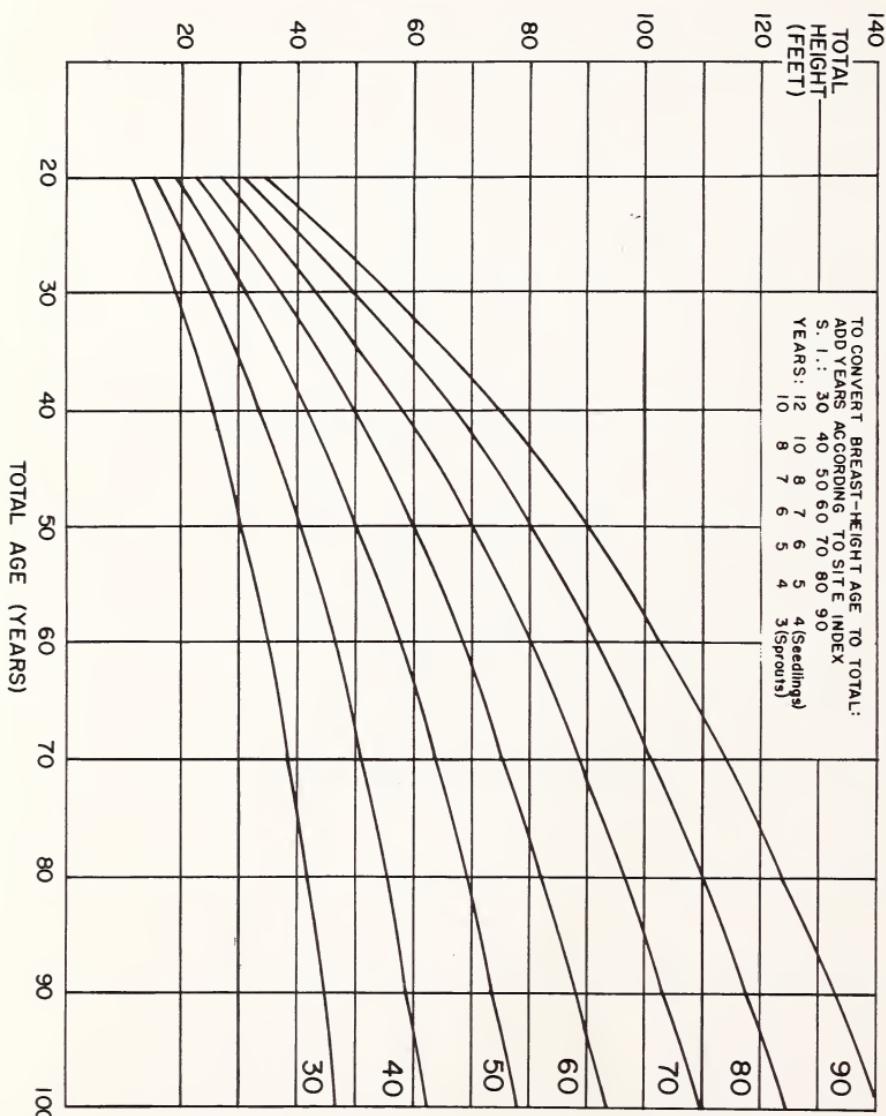
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 30 YEARS, IN MISSISSIPPI VALLEY STATES.



SOURCE: BROADFOOT, W.M., S.F.E.S. OCCAS. PAPER NO. 178, 1960. WHEN REVISED TO 30 YEARS FROM 25 YEARS, THE DATA PUBLISHED BY NEEBE, D.J. & BOYCE, S.G., C.S.F.E.S. STA. NOTE NO. 126 1959 FITS ABOVE CURVES CLOSELY EXCEPT IN AGES BETWEEN 10 & 30 YEARS FOR CURVES "100" AND HIGHER.



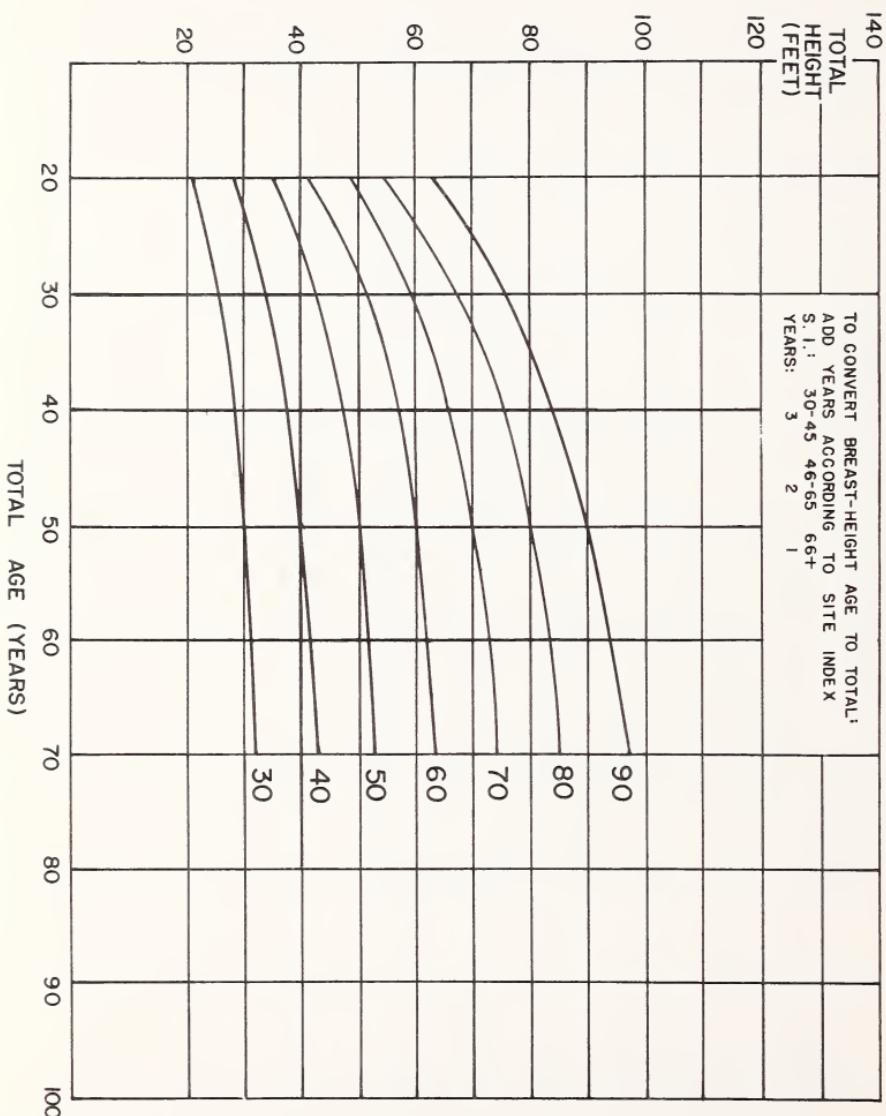
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX  
AT 50 YEARS, IN EASTERN UNITED STATES.



SOURCE: BOISEN, A.T. & NEWLIN, J.A., THE COMMERCIAL HICKORIES,  
USDA, FOREST SERVICE BULL. NO. 80, 1910.



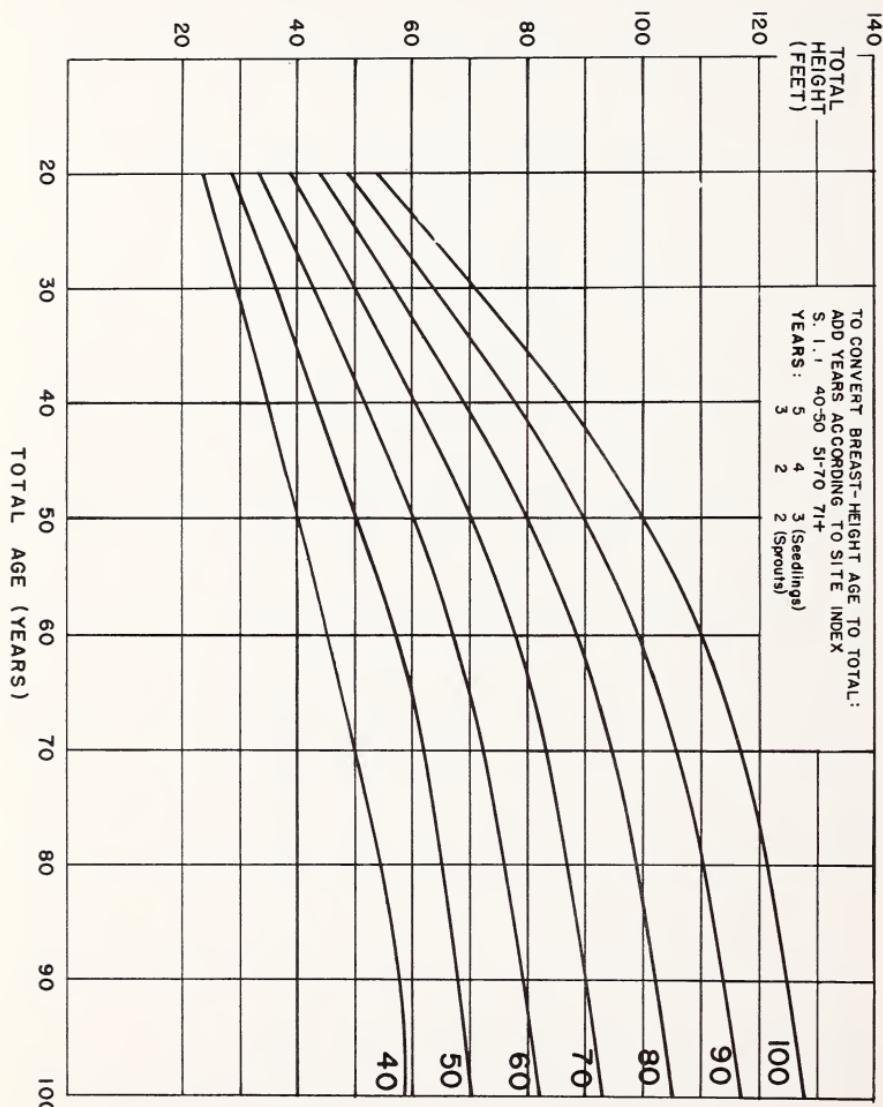
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX  
AT 50 YEARS, IN CENTRAL STATES REGION.



SOURCE: KELLOGG, L.F., SITE INDEX CURVES FOR PLANTATION BLACK LOCUST, CENTRAL STATES REGION, CENTRAL STATES EXP. STA. NOTE 36, 1939.



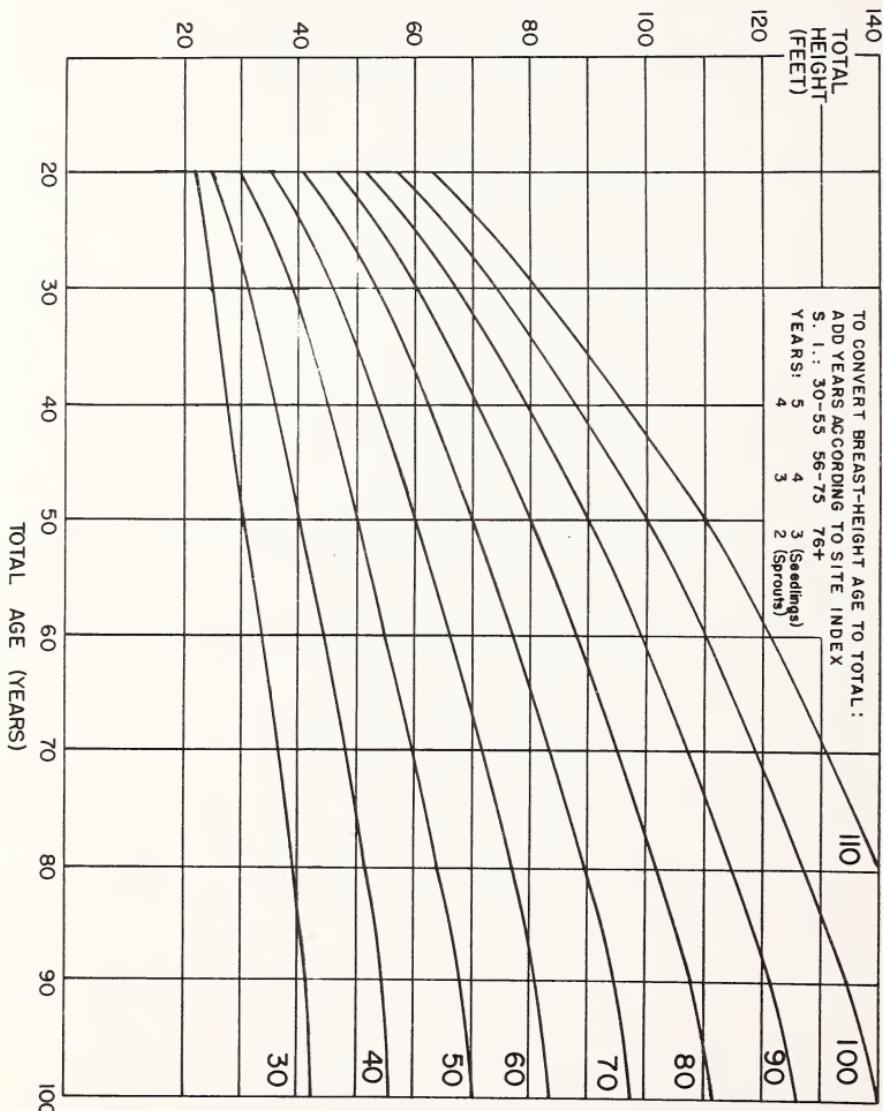
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT  
TREES, BY SITE INDEX AT 50 YEARS, IN NEW ENGLAND & N.Y.



SOURCE : CONSTRUCTED FROM DATA REPORTED BY R.W. FOSTER,  
FOREST SCIENCE, VOL. 5, NO. 3, SEPT., 1959.  
(FOR TREES OF SEEDLING ORIGIN ONLY)



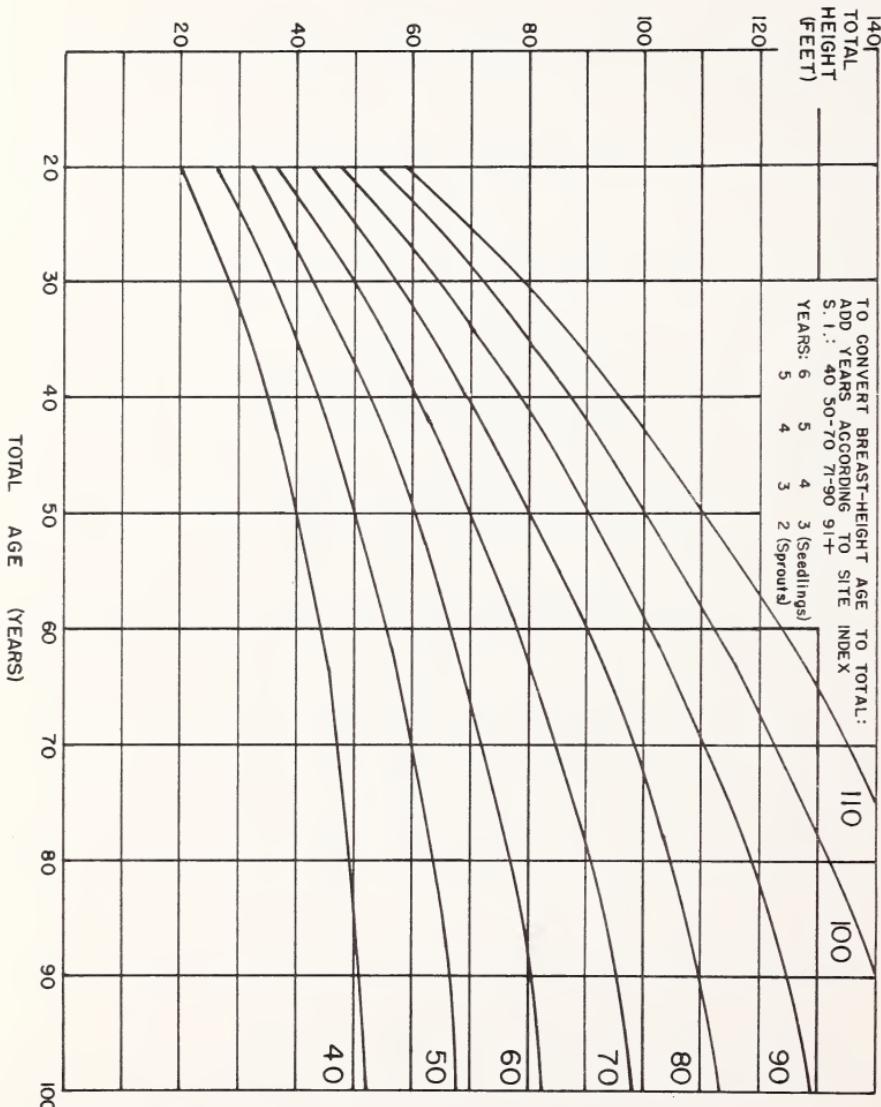
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN VERMONT.



SOURCE: CONSTRUCTED FROM FORMULA DEVELOPED BY R.O. CURTIS & B.W. POST, BULL. 629, AGR. EXP. STA., U. OF VERMONT & STATE AGR. COLLEGE, AUGUST, 1962.



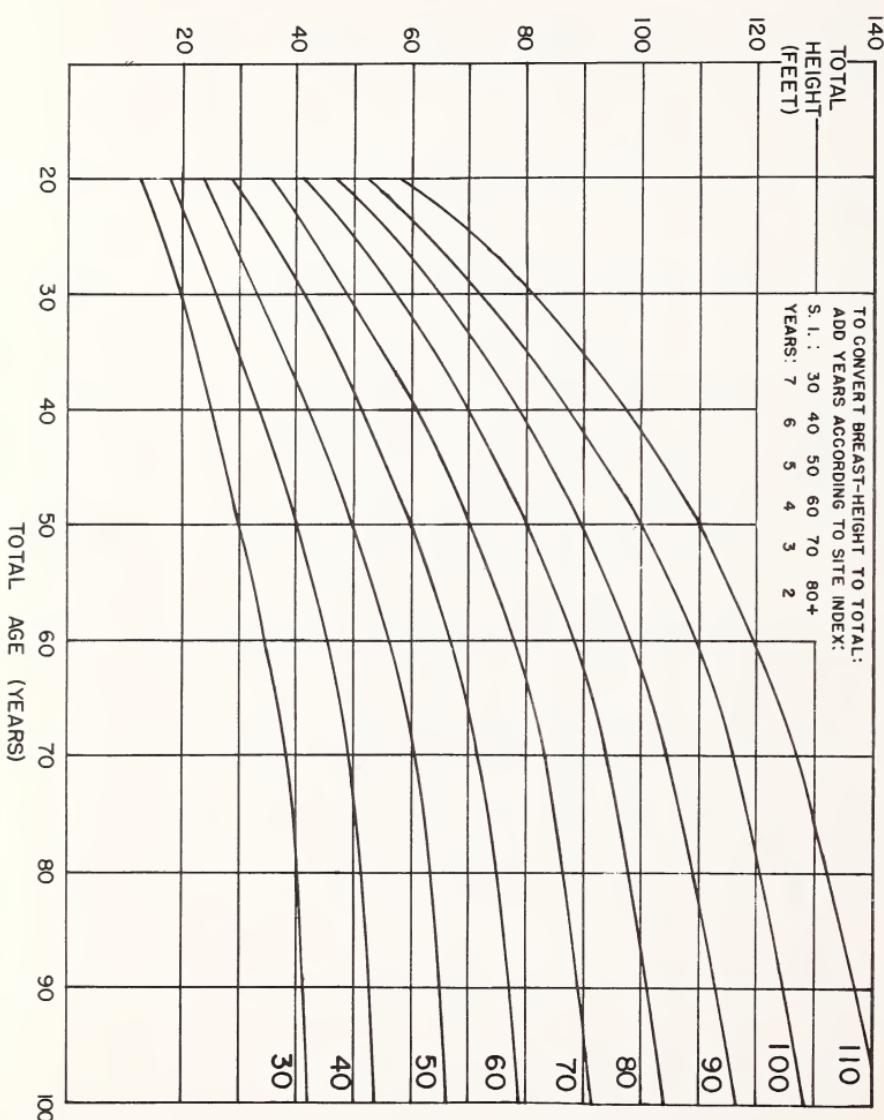
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN EASTERN UNITED STATES.



SOURCE: BASED ON DATA FROM GEVORKIANTZ, S.R., LAKE STATES EXP. STA.  
TECH. NOTE NO. 485, 1957. OLSON, D.J., S.E.F.E.S. RES. NOTES NO. 125, 1959.



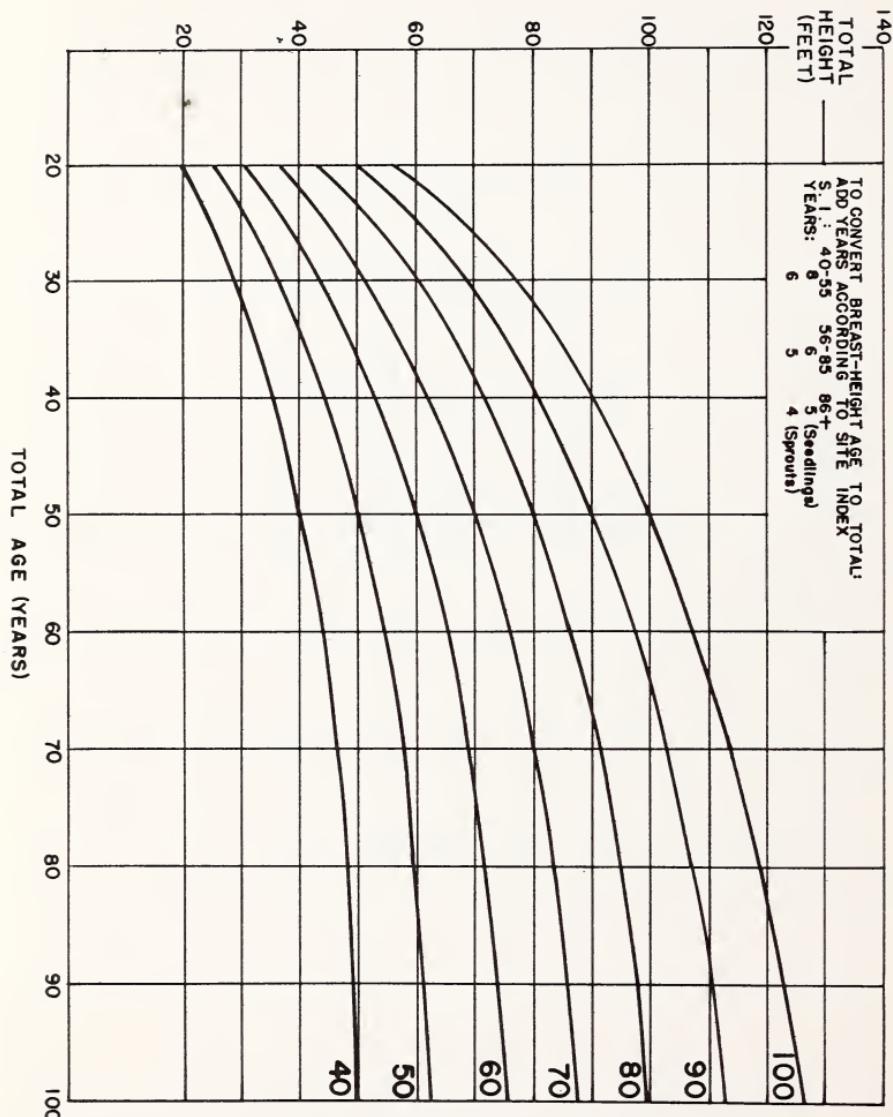
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES  
BY SITE INDEX AT 50 YEARS, IN OAK-HICKORY FORESTS.



SOURCE: G.L. SCHNUR, YIELD STAND, & VOLUME TABLES FOR EVEN-AGED UPLAND OAK FORESTS, U.S.D.A., TECH. BULL. NO. 560 (1937). D.J. OLSON, JR., S.E. FOREST EXP STA. RESEARCH NOTES NO. 125 APRIL 1959.



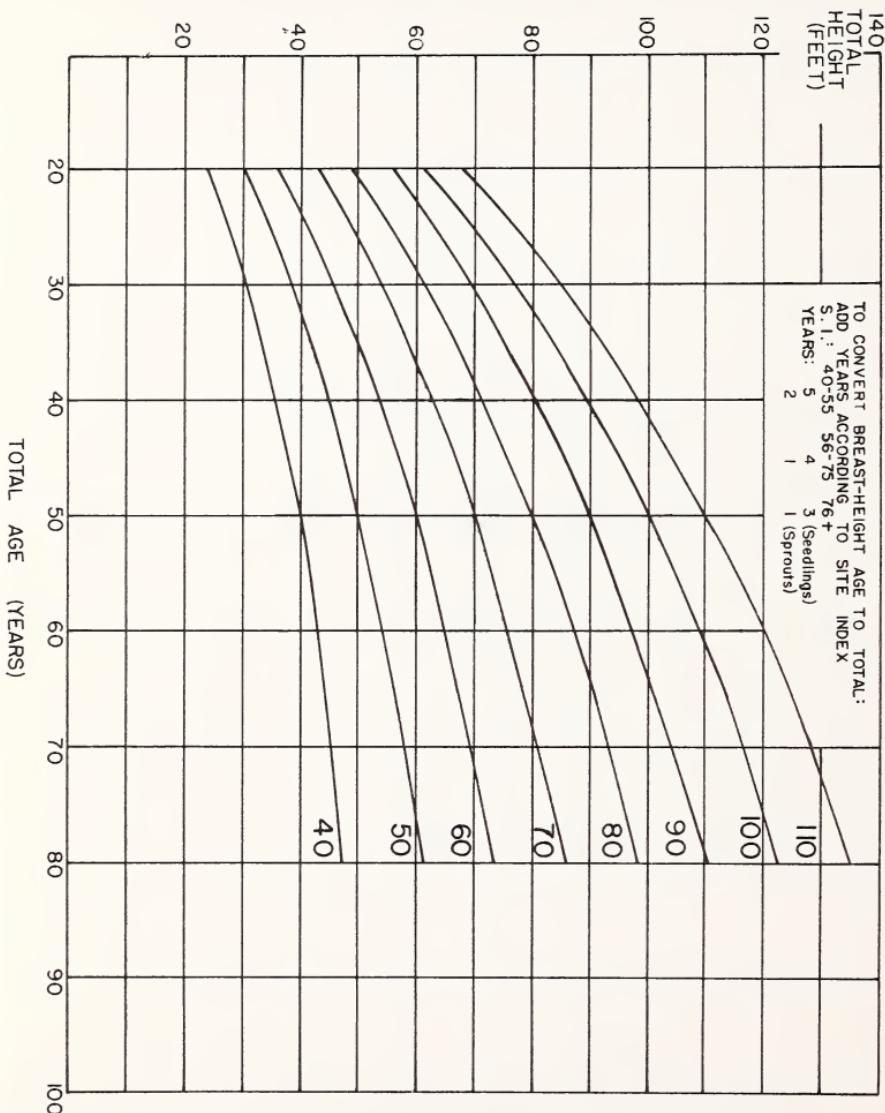
**HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES,  
BY SITE INDEX AT 50 YEARS, IN SOUTHEASTERN U. S.**



SOURCE: BASED ON DATA FROM OLSON, D. J., S.E.F.E.S. RES.  
NOTES NO. 125, 1959.



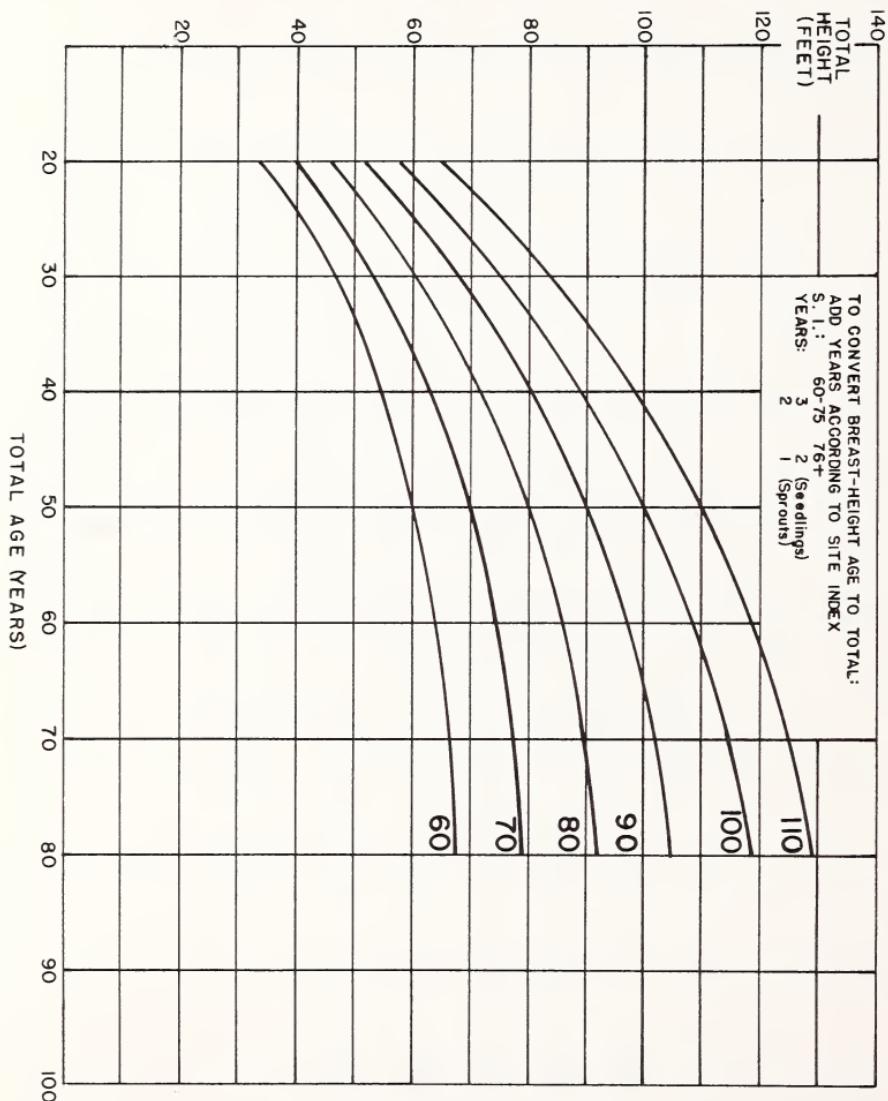
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN VIRGINIA, MARYLAND, NEW JERSEY & NORTHWARD.



SOURCE: TRENK, F.B., "SWEETGUM IN MARYLAND", U. OF MD. & MD. STATE DEPT. OF FORESTRY, 1929.



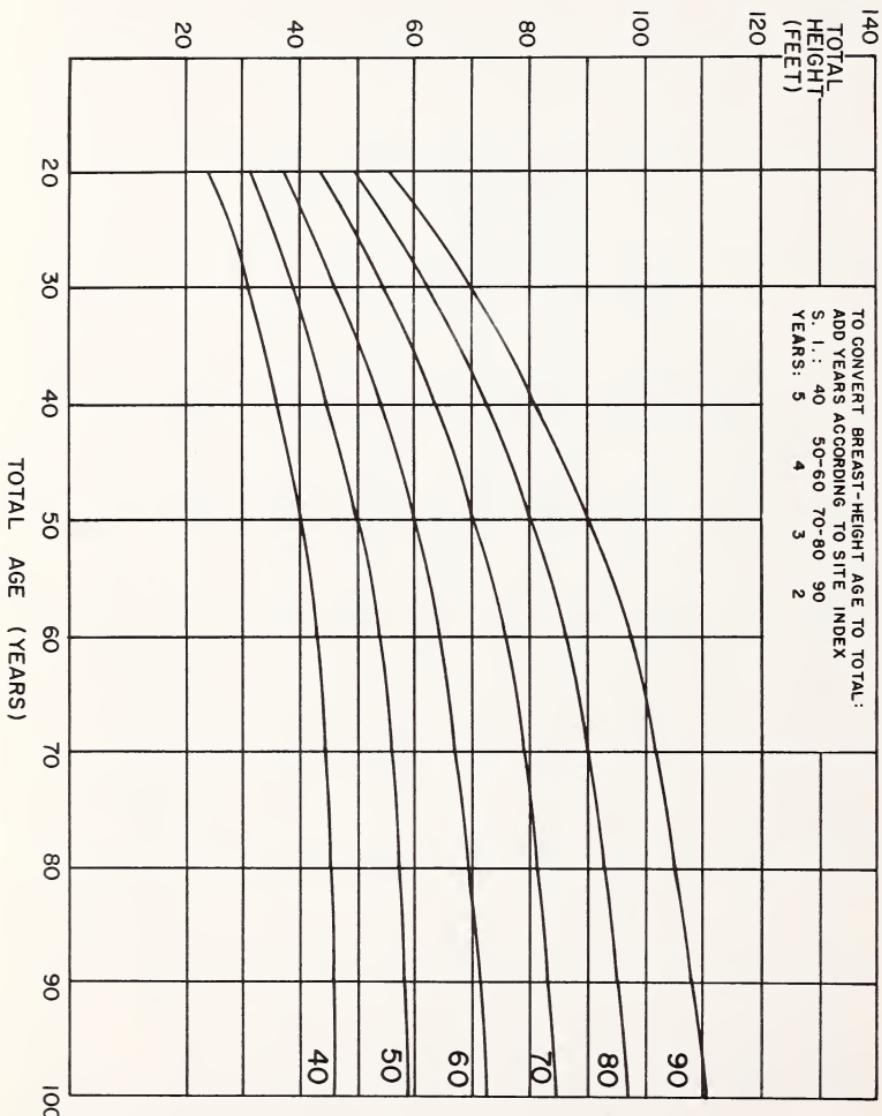
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES,  
BY SITE INDEX OF 50 YEARS, IN WEST VIRGINIA, IN STATES OF  
OHIO & MISSISSIPPI VALLEYS, AND SOUTHEASTERN STATES.



SOURCE: BROADFOOT, W.M., & KRINARD, R.M., SO. FOR. EXP. STA.  
OCCAS. PAPER NO. 176, 1959.



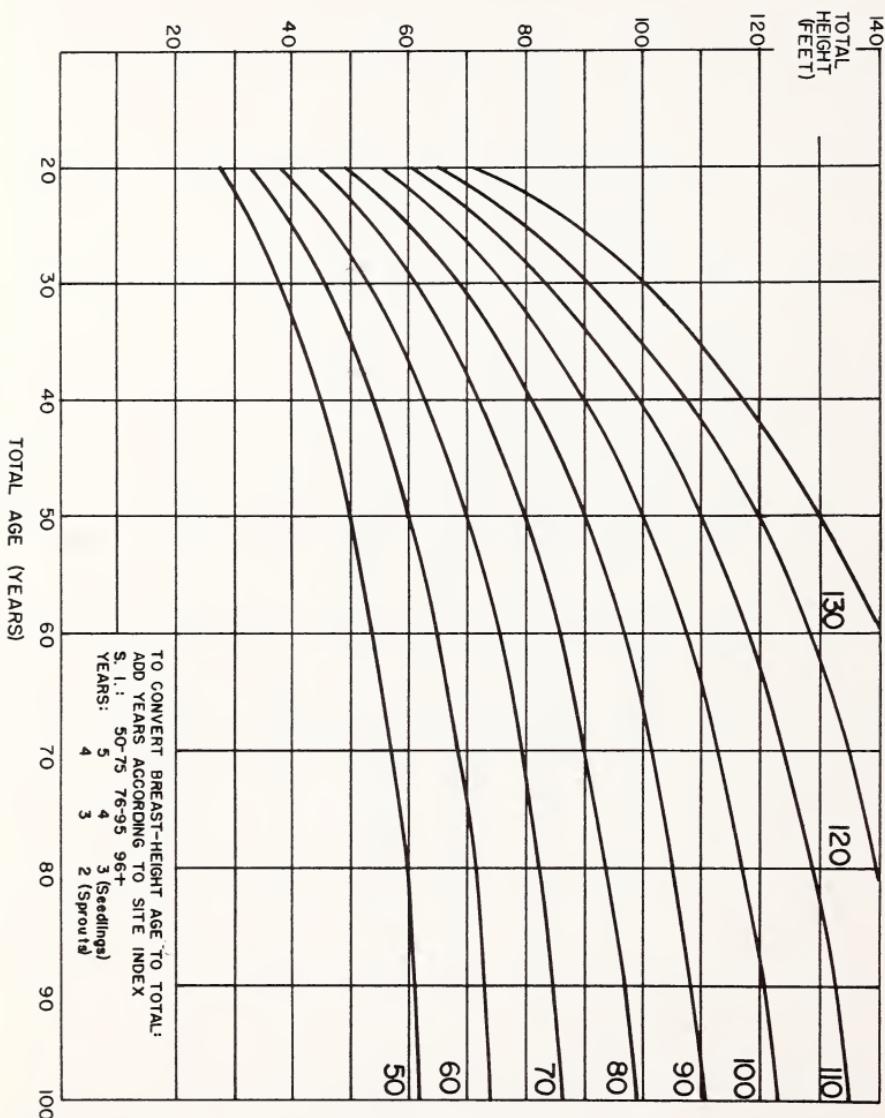
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX  
AT 50 YEARS, IN CENTRAL STATES REGION.



SOURCE: KELLOGG, L.E., SITE INDEX CURVES FOR PLANTATION BLACK WALNUT, CENTRAL STATES REGION, CENTRAL STATES FOR. EXP. STA. NOTE # 35, 1939.



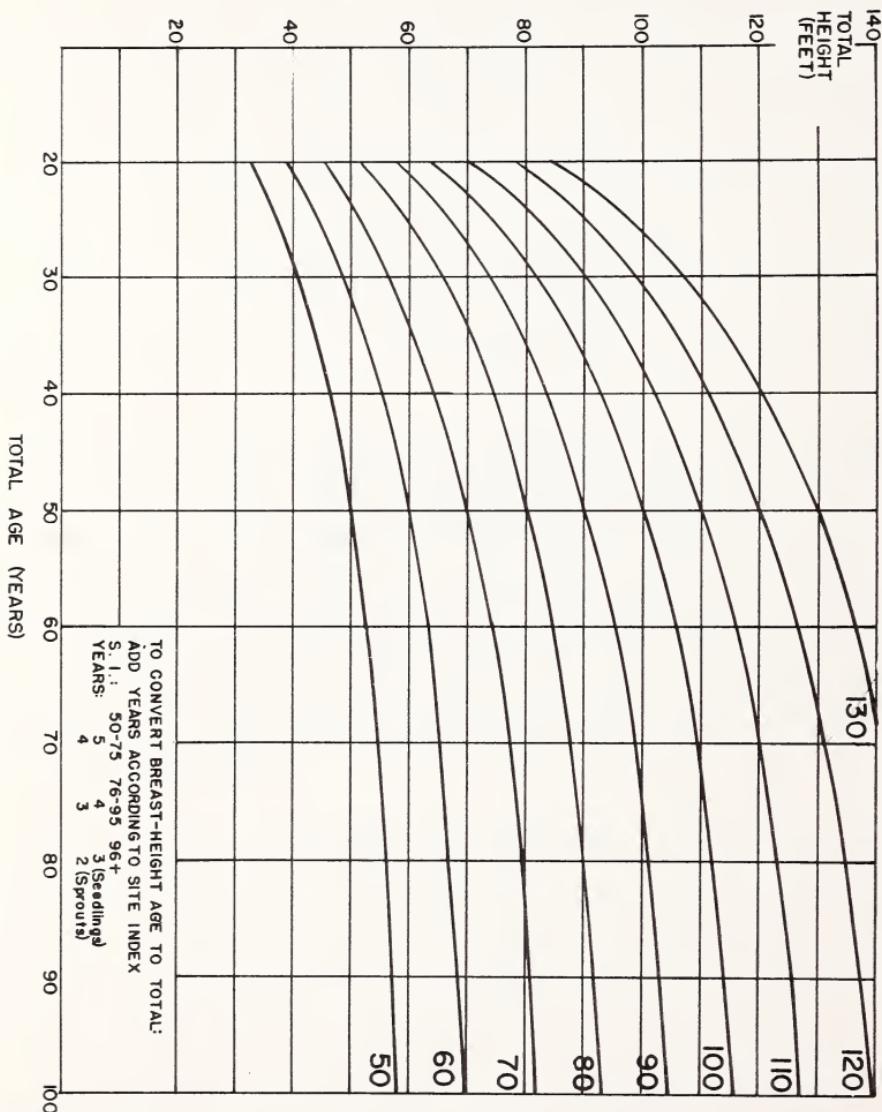
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN APPALACHIAN MOUNTAIN AREAS.



SOURCE: BECK, D.E., S.E.F.E.S. RES. NOTES NO. 180, OCT. 1962.



HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN COASTAL PLAIN AND PIEDMONT AREAS, IN NATURAL RANGE OUTSIDE MOUNTAIN AREAS.



SOURCE: BECK, D.E., SEFES. RES. NOTES NO. 180, OCT. 1962.  
McCarthy, E.F., U.S.D.A. TECH. BULL. NO. 356, 1933.



## SITE INDEX COMPARISONS FOR SOME FOREST SPECIES

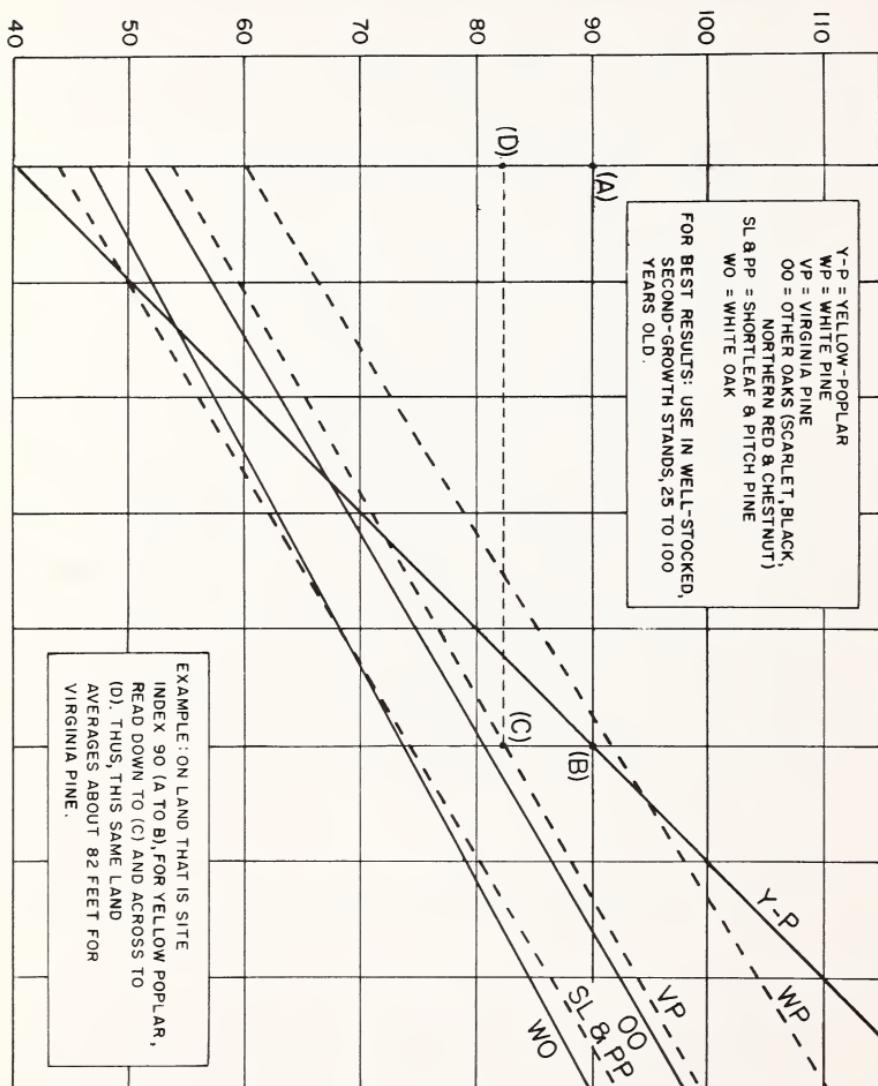
Determination of site index is a problem where several species are growing on the same land, where the land may be bare, where stocked with very young stands or very old remnant stands, or where the species for which site index is desired is not present. Under such circumstances, the ideal way to obtain site index is by determining the soil-site relationship. However, this may require as many studies as there are species, and each study requires considerable time and effort.

One quicker and easier method is to relate the site indices of several species to one another. Thus, if the site index can be determined for one species, either from trees or by soil-site studies, the site indices of the other species can also be determined. For convenience, published comparisons for some species are shown on the following pages.

Of course, there are limitations in the use of such comparisons. For example, we must assume that the growth of each of the several species is related to the same basic factors of site. In addition, the method cannot be used to determine site index of a species on sites on which the species does not normally occur. Finally, application of such comparisons should be restricted to stands and sites similar to those used in deriving the same.



SITE INDEX (HEIGHT IN FEET AT TOTAL AGE OF 50 YEARS)

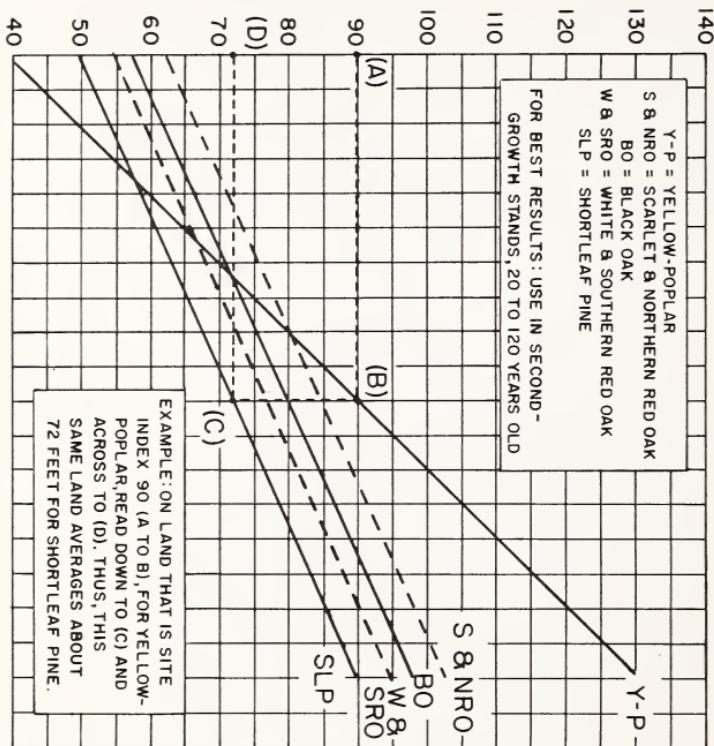


SOURCE: DOOLITTLE, W.T., SITE INDEX COMPARISONS FOR  
 SEVERAL FOREST SPECIES IN THE SOUTHERN APPALACHIANS,  
 SOIL SCI. SOC. AMER. PROC. 22: 455-458, ILLUS.

FOR 10 SPECIES IN SOUTHERN APPALACHIAN REGION.



SITE INDEX (HEIGHT IN FEET AT TOTAL AGE OF 50 YEARS)

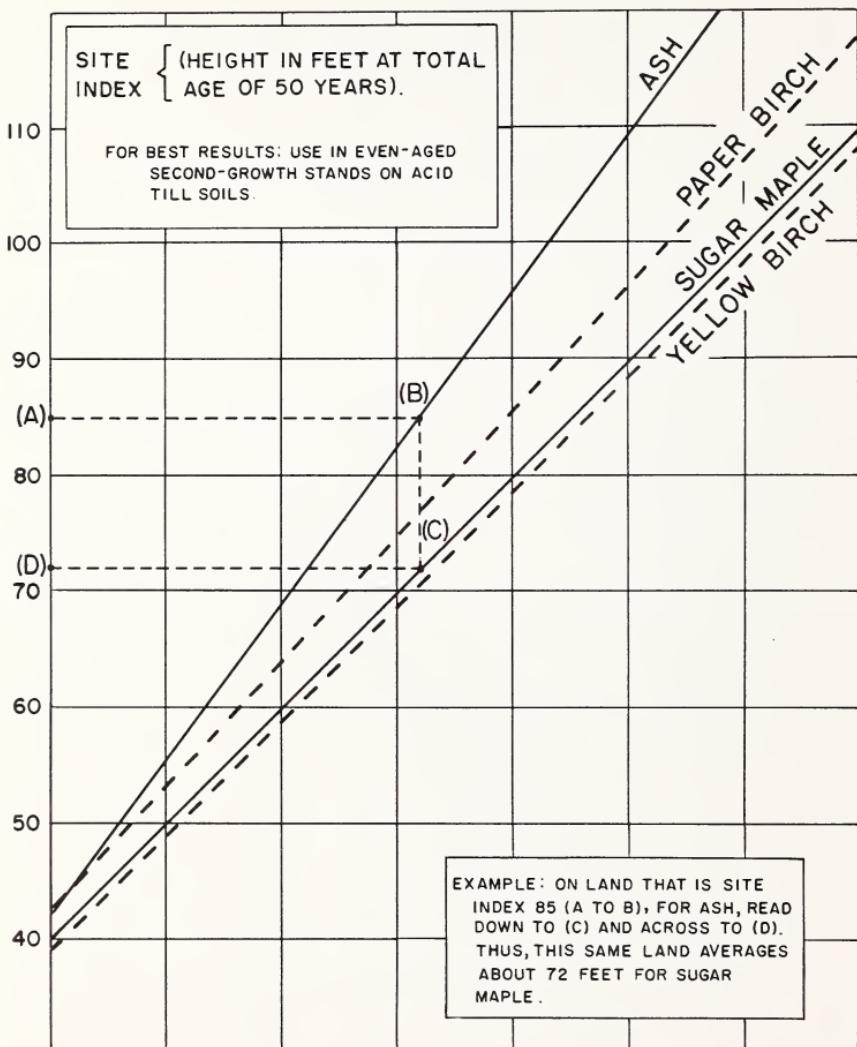


EXAMPLE: ON LAND THAT IS SITE INDEX 90 (A TO B), FOR YELLOW-POPLAR, READ DOWN TO (C) AND ACROSS TO (D). THUS, THIS SAME LAND AVERAGES ABOUT 72 FEET FOR SHORTLEAF PINE.

SOURCE: OLSON, JR., D. F., & DELLA-BIANCA, L., SEFES STA. PAPER NO. 104, OCT. 1959.

FOR 7 SPECIES IN PIEDMONT AREAS OF VIRGINIA AND THE CAROLINAS.



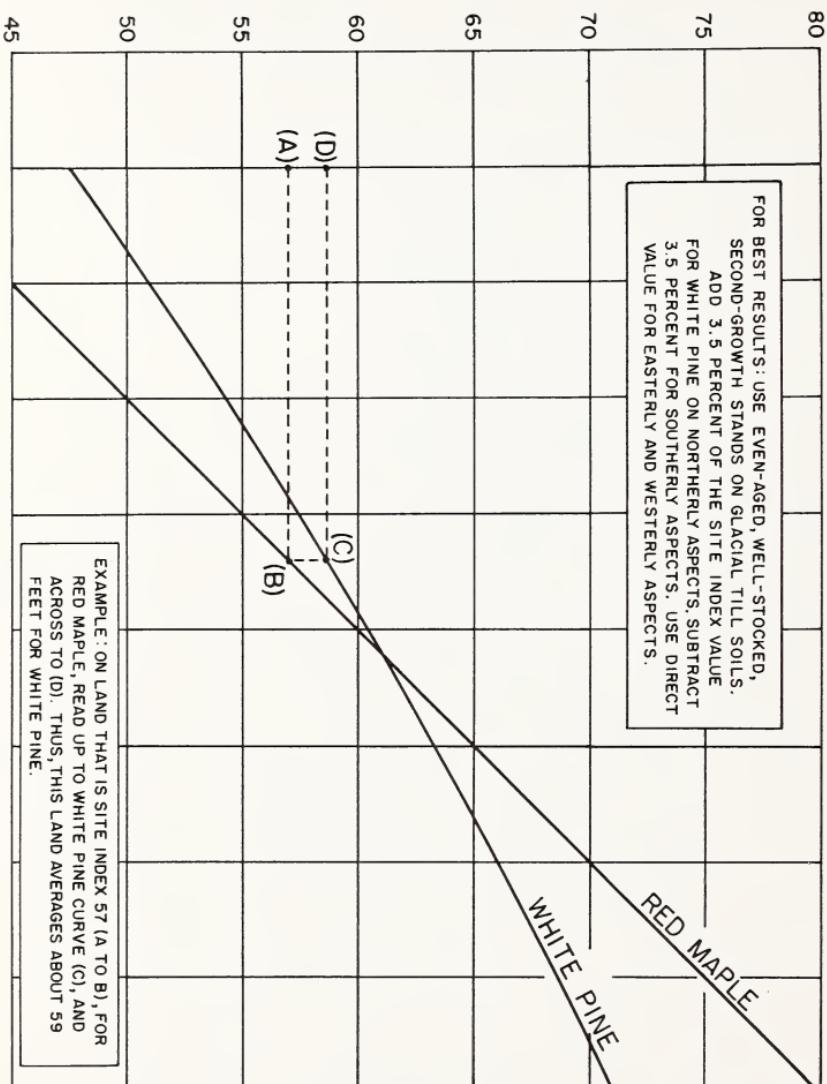


SOURCE: CURTIS, R. O., & POST, B. W., NEFES STA. PAPER NO. 171, 1962.

FOR FOUR NORTHERN HARDWOODS IN VERMONT.



SITE INDEX (HEIGHT IN FEET AT TOTAL AGE OF 50 YEARS)



SOURCE: FOSTER, R. W., FOREST SCIENCE: 5 (3) 1959. pp. 279-290.

FOR WHITE PINE AND RED MAPLE IN NEW ENGLAND AND NEW YORK.



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